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MEDICAL INQUIRIES

AND

OBSERVATIONS.

BY BENJAMIN RUSH, M. D.

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IN FOUR VOLUMES.

VOL. IV.

THE SECOND EDITION,

REVISED AND ENLARGED BY THE AUTHOR.

PHILADELPHIA,

PUBLISHED BY J. CONRAD & CO. CHESNUT-STREET, PHILADELPHIA; M. & J. CONRAD & CO. BALTIMORE; RAPIN, CONRAD, & CO. WASHINGTON; SOMERVELL & CONRAD, PETERSBURG; AND BONSAL, CONRAD, & CO. NORFOLK.

PRINTED BY T. & G. PALMER, 116, HIGH-STREET.

1805.

**Adams
130.12
Vol.4

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AN ACCOUNT

OF THE

BILIOUS REMITTING AND INTERMITTING

YELLOW FEVER,

AS IT

APPEARED IN PHILADELPHIA,

IN 1797.

AN ACCOUNT, &c.

THE winter of 1797 was in general healthy. During the spring, which was cold and wet, no diseases of any consequence occurred. The spring vegetables were late in coming to maturity, and there were every where in the neighbourhood of Philadelphia scanty crops of hay. In June and July there fell but little rain. Dysenteries, choleras, scarlatina, and mumps, appeared in the suburbs in the latter month. On the 8th of July I visited Mr. Frisk, and on the 25th of the same month I visited Mr. Charles Burrel in the yellow fever, in consultation with Dr. Physick. They both recovered by the use of plentiful depleting remedies.

The weather from the 2d to the 9th of August was rainy. On the 1st of this month I was called

to visit Mr. Nathaniel Lewis, in a malignant bilious fever. On the 3d I visited Mr. Elisha Hall, with the same disease. He had been ill several days before I saw him. Both these gentlemen died on the 6th of the month. They were both very yellow after death. Mr. Hall had a black vomiting on the day he died.

The news of the death of these two citizens, with unequivocal symptoms of yellow fever, excited a general alarm in the city. Attempts were made to trace it to importation, but a little investigation soon proved that it was derived from the foul air of a ship which had just arrived from Marseilles, and which discharged her cargo at Pine-street wharf, near the stores occupied by Mr. Lewis and Mr. Hall. Many other persons about the same time were affected with the fever from the same cause, in Water and Penn-streets. About the middle of the month, a ship from Hamburgh communicated the disease, by means of her foul air, to the village of Kensington. It prevailed, moreover, in many instances in the suburbs, and in Kensington, from putrid exhalations from gutters and marshy grounds, at a distance from the Delaware, and from the foul ships which have been mentioned. Proofs of the truth of each of these assertions were afterwards laid before the public.

The disease was confined chiefly to the district of Southwark and the village of Kensington, for several weeks. In September and October, many cases occurred in the city, but most of them were easily traced to the above sources.

The following account of the weather, during the months of August, September, and October was obtained from Mr. Thomas Pryor. It is different from the weather in 1793. It is of consequence to attend to this fact, inasmuch as it shows that an inflammatory constitution of the atmosphere can exist under different circumstances of the weather. It likewise accounts for the variety in the symptoms of the fever in different years and countries. Such is the influence of season and climate upon the symptoms of this fever, that it led Dr. M'Kitterick to suppose that the yellow fever of Charleston, so accurately described by Dr. Lining, in the second volume of the Physical and Literary Essays of Edinburgh, was a different disease from the yellow fever of the West-Indies*.

* De Febre Indiæ-Occidentalis Maligna Flava, p. 12.

METEOROLOGICAL OBSERVATIONS,

MADE IN PHILADELPHIA.

AUGUST, 1797.

D.	Ther.		Barom.		Winds and Weather.
1	73	75	30	0	S. E. E. Rain in the forenoon and afternoon.
2	72	76	30	0	N. E. by E. Cloudy, with rain in the afternoon and night. Wind E. by N.
3	72	78	30	6	E. ½ N. Rain in the morning, and all day and night.
4	72	78	30	4	E. Rained hard all day and at night.
5	74	79	29	84	Wind light, S. W. Cloudy. Rain this morning. The air extremely damp; wind shifted to N. W. This evening heavy showers, with thunder.
6	73	76	30	86	W. N. W. Cloudy.
7	70	76	30	4	N. W. Close day. Rain in the evening and all night. Wind to E.
8	72	76	29	95	E. Rain this morning.
9	72	76	29	86	S. W. Cloudy morning.
10	69	73	30	16	N. W. Clear.
11	70	74	30	25	N. W. Clear. Rain all night.
12	71	74	30	5	S. W. Cloudy. Rain in the morning. Cloudy all day. Rain at night.
13	73	75	29	87	S. W. Cloudy. Rain all day.
14	70	74	29	9	N. W. Clear fine morning.
15	56	60	30	15	N. W. Clear fine morniug.
16	60	64	30	24	N. W. Clear fine morning.
17	60	65	30	24	N. W. Air damp.
18	68	75	30	4	S. W. Cloudy. Rain, with thunder at night: a fine shower.
19	72	78	29	7	N. W. Clear. Cloudy in the evening, with thunder.
20	70	77	29	8	W. N. W. Fine clear morning.
21	74	76	29	9	N. W. Clear to E.
22	68	76			E. Small shower this morning. Hard shower at 11, A. M. Wind N. E.

AUGUST, 1797.

D.	Ther.		Barom.		Winds and Weather.
23	71	76	29	92	E. Cloudy. At noon calm.
24	71	75	29	95	Calm morning and clear.
25	70	75	30	5	N. E. Clear. Rain in the afternoon, with thunder.
26	70	75	30	5	S. E. Rain in the morning. Rained hard in the night, with thunder, N. W.
27	68	76	29	9	N. W. Fine clear morning.
28	64	75	29	96	N. W. Clear.
29	59	70	30	0	E. Clear.
30	70	76	30	1	E. by S. Rain in the morning.
31	68	74	30	14	S. E. Cloudy. Damp air and sultry.

SEPTEMBER, 1797.

D.	Ther.		Barom.		Winds and Weather.
1	73	80	30	6	S. W. Cloudy. Damp air. Rain in the morning.
2	79	80	29	9	N. W. Clear. Cloudy in the evening, with lightning to the southward.
3	68	74	30	0	N. by W. Cloudy. Clear in the afternoon and night.
4	66	74	30	7	W. N. W. Clear fine morning.
5	58	73	30	1	N. W. Clear. Cloudy in the evening.
6	58	72	30	13	Fresh at E. Clear. Rain in the evening.
7	56	76	30	28	E. Clear. Cloudy in the evening.
8	54	65	30	1	N. E. Clear and cool morning. Flying clouds at noon.
9	56	65	30	1	E. N. E. Clear.
10	58	63	30	26	N. E. Clear fine morning. Wind fresh at N. E. all day.
11	53	64	30	13	N. to E. with flying clouds.
12	51	62	30	6	W. N. W. Clear cool morning.

SEPTEMBER, 1797.

D.	Ther.		Barom.		Winds and Weather.
13	56	67	30	3	S. W. Cloudy. Clear in the afternoon.
14	64	70	29	98	S. W. Clear.
15	66	73	29	85	S. W. Rain in the morning. Cloudy in the afternoon.
16	62	70	29	95	N. W. Clear.
17	56	67	30	0	N. W. Clear.
18	58	63	29	88	E. Cloudy. Rained all day, and thunder.
			29	62	Rained very heavy at night.
19	55	63	29	75	W. N. W. Clear fine morning.
20	47	63	30	8	W. N. W. Clear fine morning. New moon at 9 50 morning.
21	46	60	30	0	N. E. Clear fine morning; to S. E. in the evening. Cloudy at night.
22	56	65	30	4	N. W. Rain in the morning. Rain at night.
23	56	66	30	0	N. N. E. Cloudy.
24	52	66	29	9	E. by S. Clear fine morning. Cloudy at
			29	78	night.
25	56	68	29	37	W. N. W. Clear fine morning; clear all day.
26	58	68	29	95	E. In the morning flying clouds.
27	48	63	30	2	N. W. Clear fine morning; clear all day.
28	48	63	30	2	W. N. W. Clear fine morning; clear all day.
29	54	63	30	15	E. Clear fine morning.
30	60	65	30	26	E. Fresh. Cloudy morning. Rain in the night.

OCTOBER, 1797.

D.	Ther.		Barom.		Winds and Weather.
1	52	65	30	16	N. E. Rain this morning, and great part of the day.
2	55	66	30	0	N. W. Clear.
3	60	70	29	9	S. E. Clear. Air damp.
4	60	70	29	5	W. N. W. Rain this morning.
5	46	60	30	0	W. N. W. to S. by W. in the evening. Clear all day. White frost this morning.
6	55	65	30	0	S. W. Clear fine morning. White frost.
7	66	76	30	0	S. W. Cloudy. Rain in the night.
8	56	70	30	29	S. Cloudy this morning; air damp. Wind shifted to W. N. W. Blows fresh.
9	50	60	29	85	W. N. W. Clear morning. Fresh at N. W. in the evening.
10	40	58	30	1	W. N. W. Clear. Frost this morning.
11	38	56	30	2	W. N. W. Cloudy.
12	34	52	30	38	W. N. W. Clear. Ice this morning.
13	45	55	30	5	N. Clear fine morning. Ice this morning.
14	40	60	30	28	N. E. Cloudy.
15	50	65	30	16	W. N. W. Clear.
16	36	56	30	2	W. N. W. Clear fine morning.
17	37	56	30	18	W. N. W. Clear fine morning.
18	47	60	29	86	W. N. W. Clear fine weather.
19	48	60	30	6	N. W. Clear fine day.
20	42	55	30	8	N. E. Cloudy. Rain in the afternoon and night. Blows fresh at N. E.
21	42	50	29	92	N. E. Blows fresh (with a little rain). Thunder in the night, with rain.
22	44	56	29	57	N. W. Rain in the morning.
23	44	56	29	95	S. W. Clear fine morning.
24	42	54	30	5	N. E. Cloudy. A great deal of rain in the night.
25	40	52	30	15	N. E. Clear fine morning.
26	36	48	30	29	W. N. W. Clear.
27	34	46	30	23	Fresh at S. W. Clear.
28	40	52	29	95	W. N. W. Cloudy.
29	34	46	29	82	W. Cloudy.
30	32	42	29	93	N. W. Clear. Hard frost this morning.
31	38	48	30	18	W. S. W. Cloudy part of this day; clear the remainder.

In addition to the register of the weather it may not be improper to add, that moschetoes were more numerous during the prevalence of the fever than in 1793. An unusual number of ants and cock-roaches were likewise observed; and it was said that the martins and swallows disappeared, for a while, from the city and its neighbourhood.

A disease prevailed among the cats some weeks before the yellow fever appeared in the city. It excited a belief in an unwholesome state of the atmosphere, and apprehensions of a sickly fall. It generally proved fatal to them.

After the first week in September there were no diseases to be seen but yellow fever. In that part of the town which is between Walnut and Vine-streets it was uncommonly healthy. A similar retreat of inferior diseases has been observed to take place during the prevalence of the plague in London, Holland, and Germany, according to the histories of that disease by Sydenham, Diemerbroek, Sennertus, and Hildanus. It appears, from the register of the weather, that it rained during the greatest part of the day on the 1st of October. The effects of this rain upon the disease shall be mentioned hereafter. On the 10th the weather became cool, and on the nights of the 12th and

13th of the month there was a frost accompanied with ice, which appeared to give a sudden and complete check to the disease.

The reader will probably expect an account of the effects of this distressing epidemic upon the public mind. The terror of the citizens for a while was very great. Rumours of an opposite and contradictory nature of the increase and mortality of the fever were in constant circulation. A stoppage was put to business, and it was computed that about two thirds of the inhabitants left the city.

The legislature of the state early passed a law, granting 10,000 dollars for the relief of the sufferers by the fever. The citizens in and out of town, as also many of the citizens of our sister states, contributed more than that sum for the same charitable purpose. This money was issued by a committee appointed by the governor of the state. An hospital for the reception of the poor was established on the east side of the river Schuylkill, and amply provided with every thing necessary for the accommodation of the sick. Tents were likewise pitched on the east side of Schuylkill, to which all those people were invited who were exposed to the danger of taking the disease, and who had not

means to provide a more comfortable retreat for themselves in the country.

I am sorry to add that the moral effects of the fever upon the minds of our citizens were confined chiefly to these acts of benevolence. Many of the publications in the newspapers upon its existence, mode of cure, and origin partook of a virulent spirit, which ill accorded with the distresses of the city. It was a cause of lamentation likewise to many serious people, that the citizens in general were less disposed, than in 1793, to acknowledge the agency of a divine hand in their afflictions. In some a levity of mind appeared upon this solemn occasion. A worthy bookseller gave me a melancholy proof of this assertion, by informing me, that he had never been asked for playing cards so often, in the same time, as he had been during the prevalence of the fever.

Philadelphia was not the only place in the United States which suffered by the yellow fever. It prevailed, at the same time, at Providence, in Rhode-Island, at Norfolk, in Virginia, at Baltimore, and in many of the country towns of New-England, New-Jersey, and Pennsylvania.

The influenza followed the yellow fever, as it did in the year 1793. It made its appearance in the latter end of October, and affected chiefly those citizens who had been out of town.

The predisposing causes of the yellow fever, in the year 1797, were the same as in the year 1793. Strangers were as usual most subject to it. The heat of the body in such persons, in the West-Indies, has been found to be between three and four degrees above that of the temperature of the natives. This fact is taken notice of by Dr. M'Kitterick, and to this he ascribes, in part, the predisposition of new comers to the yellow fever.

In addition to the common exciting causes of this disease formerly enumerated, I have only to add, that it was induced in one of my patients by smoking a segar. He had not been accustomed to the use of tobacco.

I saw no new premonitory symptoms of this fever except a tooth-ach. It occurred in Dr. Physick, Dr. Caldwell, and in my pupil, Mr. Bellenger. In Miss Elliot there was such a soreness in her teeth, that she could hardly close her mouth on the day in which she was attacked by the fever. Neither

of these persons had taken mercury to obviate the disease.

I shall now deliver a short account of the symptoms of the yellow fever, as they appeared in several of the different systems of the body.

I. There was but little difference in the state of the pulse in this epidemic from what has been recorded in the fevers of 1793 and 1794. I perceived a pulse, in several cases, which felt like a soft quill which had been *shattered* by being trodden upon. It occurred in Dr. Jones and Dr. Dobell, and in several other persons who had been worn down by great fatigue, and it was, in every instance, followed by a fatal issue of the fever. In Dr. Jones this state of the pulse was accompanied with such a difficulty of breathing, that every breath he drew, on the day of his attack, he informed me, was the effort of a sigh. He died on the 17th of September, and on the sixth day of his fever.

The action of the arteries was, as usual, very irregular in many cases. In some there was a distressing throbbing of the vessels in the brain, and in one of my patients a similar sensation in the bowels, but without pain. Many people had issues of blood from their blisters in this fever.

I saw nothing new in the effects of the fever upon the liver, lungs, brain, nor upon the stomach and bowels.

II. The excretions were distinguished by no unusual marks. I met with no recoveries where there were not black stools. They excoriated the rectum in Dr. Way. It was a happy circumstance where morbid bilious matter came away in the beginning of the disease. But it frequently resisted the most powerful cathartics until the 5th or 7th day of the fever, at which time it appeared rather to yield to the disorganization of the liver than to medicine. Where sufficient blood-letting had been previously used, the patient frequently recovered, even after the black discharges from the bowels took place in a late stage of the disease.

Dr. Coxe informed me, that he attended a child of seventeen months old which had *white* stools for several days. Towards the close of its disease it had black stools, and soon afterwards died.

Several of my patients discharged worms during the fever. In one instance they were discharged from the mouth.

A preternatural frequency in making pale water attended the first attack of the disease in Mr. Joseph Fisher.

A discharge of an unusual quantity of urine preceded, a few hours, the death of the daughter of Mrs. Read.

In two of my patients there was a total suppression of urine. In one of them it continued five days without exciting any pain.

There was no disposition to sweat after the first and second days of the fever. Even in those states of the fever, in which the intermissions were most complete, there was seldom any moisture, or even softness on the skin. This was so characteristic of malignity in the bilious fever, that where I found the opposite state of the skin, towards the close of a paroxysm, I did not hesitate to encourage my patient, by assuring him that his fever was of a mild nature, and would most probably be safe in its issue.

III. I saw no unusual marks of the disease in the nervous system. The mind was seldom affected by delirium after the loss of blood. There was a

disposition to shed tears in two of my patients. One of them wept during the whole time of a paroxysm of the fever. In one case I observed an uncommon dulness of apprehension, with no other mark of a diseased state of the mind. It was in a man whose faculties, in ordinary health, acted with celerity and vigour.

Dr. Caldwell informed me of a singular change which took place in the operations of his mind during his recovery from the fever. His imagination carried him back to an early period of his life, and engaged him, for a day or two, in playing with a bow and arrow, and in amusements of which he had been fond when a boy. A similar change occurred in the mind of my former pupil, Dr. Fisher, during his convalescence from the yellow fever in 1793. He amused himself for two days in looking over the pictures of a family Bible which lay in his room, and declared that he found the same kind of pleasure in this employment that he did when a child. However uninteresting these facts may now appear, the time will come when they may probably furnish useful hints for completing the physiology and pathology of the mind.

Where blood-letting had not been used, patients frequently died of convulsions.

IV. The senses of seeing and feeling were impaired in several cases. Mrs. Bradford's vision was so weak that she hardly knew her friends at her bed-side. I had great pleasure in observing this alarming symptom suddenly yield to the loss of four ounces of blood.

Several persons who died of this fever did not, from the beginning to the end of the disease, feel any pain. I shall hereafter endeavour to explain the cause of this insensible state of the nerves.

The appetite for food was unimpaired for three days in Mr. Andrew Brown, at a time when his pulse indicated a high grade of the fever. I heard of several persons who ate with avidity just before they died.

V. Glandular swellings were very uncommon in this fever. I should have ascribed their absence to the copious use of depleting remedies in my practice, had I not been informed that morbid affections of the lymphatic glands were unknown in the city hospital, where blood-letting was seldom used, and where the patients, in many instances, died before they had time to take medicine of any kind.

VI. The skin was cool, dry, smooth, and even shining in some cases. Yellowness was not universal. Those small red spots, which have been compared to moscheto bites, occurred in several of my patients. Dr. John Duffield, who acted as house surgeon and apothecary at the city hospital, informed me that he saw vibices on the skin in many cases, and that they were all more or less sore to the touch.

VII. The blood was dissolved in a few cases. That appearance of the blood, which has been compared to the washings of flesh, was very common. It was more or less sizy towards the close of the disease in most cases. I have suspected, from this circumstance, that this mark of ordinary morbid action or inflammation was in part the effect of the mercury acting upon the blood-vessels. It is well known that sizy blood generally accompanies a salivation. If this conjecture be well founded, it will not militate against the use of mercury in malignant fevers, for it shows that this valuable medicine possesses a power of changing an extraordinary and dangerous degree of morbid action in the blood-vessels to that which is more common and safe. I have seldom seen a yellow fever terminate fatally after the appearance of sizy blood.

Dr. Stewart informed me, that in those cases in which the serum of the blood had a yellow colour, it imparted a saline taste only to his tongue. He was the more struck with this fact, as he perceived a strong bitter state upon his skin, in a severe attack of the yellow fever in 1793.

I proceed next to take notice of the type of the fever.

In many cases, it appeared in the form of a remitting and intermitting fever. The quotidian and tertian forms were most common. In Mr. Robert Wharton, it appeared in the form of a quartan. But it frequently assumed the character which is given of the same fever in Charleston, by Dr. Lining. It came on without chills, and continued without any remission for three days, after which the patient believed himself to be well, and sometimes rose from his bed, and applied to business. On the fourth or fifth day, the fever returned, and unless copious evacuations had been used in the early stage of the disease, it generally proved fatal. Sometimes the powers of the system were depressed below the return of active fever, and the patient sunk away by an easy death, without pain, heat, or a quick pulse. I have been much puzzled to distinguish a crisis of the fever on the third or fourth

day, from the insidious appearance which has been described. It deceived me in 1793. It may be known by a preternatural coolness in the skin, and languor in the pulse, by an inability to sit up long without fatigue or faintness, by a dull eye, and by great depression of mind, or such a flow of spirits as sometimes to produce a declaration from the patient that "he feels too well." Where these symptoms appear, the patient should be informed of his danger, and urged to the continuance of such remedies as are proper for him.

The following states or forms were observable in the fever:

1. In a few cases, the miasmata produced death in four and twenty hours, with convulsions, coma, or apoplexy.

2. There were *open* cases, in which the pulse was full and tense as in a pleurisy or rheumatism, from the beginning to the end of the fever. They were generally attended with a good deal of pain.

3. There were *depressed* or *locked* cases, in which there were a sense of great debility, but little or no pain, a depressed and slow pulse, a cool

skin, cold hands and feet, and obstructed excretions.

4. There were *divided* or *mixed* cases, in which the pulse was active until the 4th day, after which it became depressed. All the other symptoms of the locked state of the fever accompanied this depressed state of the pulse.

5. There were cases in which the pulse imparted a perception like that of a soft and *shattered* quill. I have before mentioned that this state of the pulse occurred in Dr. Jones and Dr. Dobell. I felt it but once, and on the day of his attack, in the latter gentleman, and expressed my opinion of his extreme danger to one of my pupils upon my return from visiting him. I did not meet with a case which terminated favourably, where I perceived this *shattered* pulse. A disposition to sweat occurred in this state of the fever.

6. There were what Dr. Caldwell happily called *walking* cases. The patients here were flushed or pale, had a full or tense pulse, but complained of no pain, had a good appetite, and walked about their rooms or houses, as if they were but little indisposed, until a day or two, and, in some instances, until a few hours before they died. We speak of

a *dumb* gout and *dumb* rheumatism; with equal propriety, the epithet might be applied to this form of yellow fever in its early stage. The impression of the remote cause of the fever, in these cases, was beyond sensation, for, upon removing a part of it by bleeding or purging, the patients complained of pain, and the excitement of the muscles passed so completely into the blood-vessels and alimentary canal, as to convert the fever into a common and more natural form. These cases were always dangerous, and, when neglected, generally terminated in death. Mr. Brown's fever came on in this insidious shape. It was cured by the loss of upwards of 100 ounces of blood, and a plentiful salivation.

7. There was the *intermitting* form in this fever. This, like the last, often deceived the patient, by leading him to suppose his disease was of a common or trifling nature. It prevented Mr. Richard Smith from applying for medical aid in an attack of the fever for several days, by which means it made such an impression upon his viscera, that depleting remedies were in vain used to cure him. He died in the prime of life, beloved and lamented by a numerous circle of relations and friends.

8. There was a form of this fever in which it resembled the mild remittent of common seasons.

It was distinguished from it chiefly by the black colour of the intestinal evacuations.

9. There were cases of this fever so light, that patients were said to be neither *sick* nor *well;* or, in other words, they were sick and well half a dozen times in a day. Such persons walked about, and transacted their ordinary business, but complained of dulness, and, occasionally, of shooting pains in their heads. Sometimes the stomach was affected with sickness, and the bowels with diarrhœa or costiveness. All of them complained of night sweats. The pulse was quicker than natural, but seldom had that convulsive action which constitutes fever. Purges always brought away black stools from such patients, and this circumstance served to establish its relationship to the prevailing epidemic. Now and then, by neglect or improper treatment, it assumed a higher and more dangerous grade of the fever, and became fatal, but it more commonly yielded to nature, or to a single dose of purging physic.

10. There were a few cases in which the skin was affected with universal yellowness, but without more pain or indisposition than usually occurs in the jaundice. They were very frequent in the year

1793, and generally prevail in the autumn, in all places subject to bilious fever.

11. There were *chronic* cases of this fever. It is from the want of observation that physicians limit the duration of the yellow fever to certain days. I have seen many instances in which it has been protracted into what is called by authors a slow nervous fever. The wife of captain Peter Bell died with a black vomiting after an illness of nearly one month. Dr. Pinckard, formerly one of the physicians of the British army in the West-Indies, in a late visit to this city informed me, that he had often seen the yellow fever put on a chronic form in the West-India islands.

In delivering this detail of the various forms of the yellow fever, I am aware that I oppose the opinions of many of my medical brethren, who ascribe to it a certain uniform character, which is removed beyond the influence of climate, habit, predisposition, and the different strength and combinations of remote and exciting causes. This uniformity in the symptoms of this fever is said to exist in the West-Indies, and every deviation from it in the United States is called by another name. The following communication, which I received from Dr. Pinckard, will show that this disease is as different

in its forms in the West-Indies as it is in this country.

" The yellow fever, as it appeared among the " troops in Guiana and the West-India islands, in " the years 1796 and 1797, exhibited such perpe- " tual instability, and varied so incessantly in its " character, that I could not discover any one " symptom to be decidedly diagnostic; and hence " I have been led into an opinion that the yellow " fever, so called, is not a distinct or specific dis- " ease, but merely an aggravated degree of the " common remittent or bilious fever of hot cli- " mates, rendered irregular in form, and augmented " in malignity, from appearing in subjects unac- " customed to the climate.

" *Philadelphia, January* 12*th*, 1798."

Many other authorities equally respectable with Dr. Pinckard's, among whom are Pringle, Huck, and Hunter, might be adduced in support of the unity of bilious fever. But to multiply them further would be an act of homage to the weakness of human reason, and an acknowledgment of the infant state of our knowledge in medicine. As well might we suppose nature to be an artist, and that diseases were shaped by her like a piece of statuary,

or a suit of clothes, by means of a chissel, or pair of scissars, as admit every different form and grade of morbid action in the system to be a distinct disease.

Notwithstanding the fever put on the eleven forms which have been described, the moderate cases were few, compared with those of a malignant and dangerous nature. It was upon this account that the mortality was greater in the same number of patients, who were treated with the same remedies, than it was in the years 1793 and 1794. The disease, moreover, partook of a more malignant character than the two epidemics that have been mentioned. The yellow fever in Norfolk, Drs. Taylor and Hansford informed me, in a letter I received from them, was much more malignant and fatal, under equal circumstances, than it was in 1795.

There were evident marks of the disease attacking more persons three days before, and three days after the *full* and *change* of the moon, and of more deaths occurring at those periods than at any other time. The same thing has been remarked in the plague by Diemerbroeck, in the fevers of Bengal by Dr. Balfour, and in those of Demarara by Dr. Pinckard.

During the prevalence of the fever I attended the following persons who had been affected by the epidemic of 1793, viz. Dr. Physick, Thomas Leaming, Thomas Canby, Samuel Bradford, and George Loxley, also Mrs. Eggar, who had a violent attack of it in the year 1794. Samuel Bradford was likewise affected by it in 1794.

During my intercourse with the sick, I felt the miasmata of the fever operate upon my system in the most sensible manner. It produced languor, a pain in my head, and sickness at my stomach. A sighing attended me occasionally, for upwards of two weeks. This symptom left me suddenly, and was succeeded by a hoarseness, and, at times, with such a feebleness in my voice as to make speaking painful to me. Having observed this affection of the trachea to be a precursor of the fever in several cases, it kept me under daily apprehensions of being confined by it. It gradually went off after the first of October. I ascribed my recovery from it, and a sudden diminution of the effects of the miasmata upon my system, to a change produced in the atmosphere by the rain which fell on that day.

The peculiar matter emitted by the breath or perspiration of persons affected by this fever, induced a sneezing in Dr. Dobell, every time he went

into a sick room. Ambrose Parey says the same thing occurred to him, upon entering the room of patients confined by the plague.

The gutters emitted, in many places, a sulphureous smell during the prevalence of the fever. Upon rubbing my hands together I could at any time excite a similar smell in them. I have taken notice of this effect of the matters which produced the disease upon the body, in the year 1794.

In order to prevent an attack of the fever, I carefully avoided all its exciting causes. I reduced my diet, and lived sparingly upon tea, coffee, milk, and the common fruits and garden vegetables of the season, with a small quantity of salted meat, and smoked herring. My drinks were milk and water, weak claret and water, and weak porter and water. I sheltered myself as much as possible from the rays of the sun, and from the action of the evening air, and accommodated my dress to the changes in the temperature of the atmosphere. By similar means, I have reason to believe, many hundred people escaped the disease, who were constantly exposed to it.

The number of deaths by the fever, in the months of August, September, and October, amounted to

between ten and eleven hundred. In the list of the dead were nine practitioners of physic, several of whom were gentlemen of the most respectable characters. This number will be thought considerable when it is added, that not more than three or four and twenty physicians attended patients in the disease. Of the survivors of that number, eight were affected with the fever. This extraordinary mortality and sickness among the physicians must be ascribed to their uncommon fatigue in attending upon the sick, and to their inability to command their time and labours, so as to avoid the exciting causes of the fever.

Among the medical gentlemen whose deaths have been mentioned, was my excellent friend, Dr. Nicholas Way. I shall carry to my grave an affectionate remembrance of him. We passed our youth together in the study of medicine, and lived to the time of his death in the habits of the tenderest friendship. In the year 1794, he removed from Wilmington, in the Delaware state, to Philadelphia, where his talents and manners soon introduced him into extensive business. His independent fortune furnished his friends with arguments to advise him to retire from the city, upon the first appearance of the fever. But his humanity prevailed over the dictates of interest and the love of life. He was

active and intelligent in suggesting and executing plans to arrest the progress of the disease, and to lessen the distresses of the poor. On the 27th of August, he was seized, after a ride from the country in the evening air, with a chilly fit and fever. I saw him the next day, and advised the usual depleting remedies. He submitted to my prescriptions with reluctance, and in a sparing manner, from an opinion that his fever was nothing but a common remittent. To enforce obedience to my advice, I called upon Dr. Griffitts to visit him with me. Our combined exertions to overcome his prejudices against our remedies were ineffectual. At two o'clock in the afternoon, on the sixth day of his disease, with an aching heart I saw the sweat of death upon his forehead, and felt his cold arm without a pulse. He spoke to me with difficulty: upon my rising from his bed-side to leave him, his eyes filled with tears, and his countenance spoke a language which I am unable to describe. I promised to return in a short time, with a view of attending the last scene of his life. Immediately after I left his room, he wept aloud. I returned hastily to him, and found him in convulsions. He died a few hours afterwards. Had I met with no other affliction in the autumn of 1797 than that which I experienced from this affecting scene, it would have been a severe one; but it was a part only of

what I suffered from the death of other friends, and from the malice of enemies.

I beg the reader's pardon for this digression. It shall be the last time and place in which any notice shall be taken of my sorrows and persecutions in the course of these volumes.

Soon after the citizens returned from the country, the governor of the state, Mr. Mifflin, addressed a letter to the college of physicians of Philadelphia, requesting to know the origin, progress, and nature of the fever which had recently afflicted the city, and the means of preventing its return. He addressed a similar letter to me, to be communicated to such gentlemen of the faculty of medicine, as were not members of the college of physicians.

The college, in a memorial to the legislature of the state, asserted that the fever had been imported in two ships, the one from Havannah, the other from Port au Prince, and recommended, as the most effectual means of preventing its recurrence, a more rigid quarantine law.

The gentlemen of the faculty of medicine, thirteen in number, in two letters to the governor of the state, the one in their private capacity, and the

other after they had associated themselves into an "Academy of Medicine," asserted that the fever had originated from the putrid exhalations from the gutters and streets of the city, and from ponds and marshy grounds in its neighbourhood; also from the foul air of two ships, the one from Marseilles and the other from Hamburgh. They enumerated all the common sources of malignant fevers, and recommended the removal of them from the city, as the most effectual method of preventing the return of the fever. These sources of fever, and the various means of destroying them, shall be mentioned in another place.

I proceed now to say a few words upon the treatment which was used in this fever. It was, in general, the same as that which was pursued in the fevers of 1793 and 1794.

I began the cure, in most cases, by *bleeding*, when I was called on the first day of the disease, and was happy in observing its usual salutary effects in its early stage. On the second day, it frequently failed of doing service, and on the subsequent days of the fever, I believe, it often did harm; more especially if no other depleting remedy had preceded it. The violent action of the blood-vessels in this disease, when left to itself for

two or three days, fills and suffocates the viscera with such an immense mass of blood, as to leave a quantity in the vessels so small, as barely to keep up the actions of life. By abstracting but a few ounces of this circulating blood, we precipitate death. In those cases where a doubt is entertained of such an engorgement of stagnating blood having taken place, it will always be safest to take but three or four ounces at a time, and to repeat it four or five times a-day. By this mode of bleeding, we give the viscera an opportunity of emptying their superfluous blood into the vessels, and thereby prevent their collapsing, from the sudden abstraction of the stimulus which remained in them. I confine this observation upon bleeding, after the first stage of the disease, only to the epidemic of 1797. It was frequently effectual when used for the first time after the first and second days, in the fevers of 1793 and 1794, and it is often useful in the advanced stage of the common bilious fever. The different and contradictory accounts of the effects of bleeding in the yellow fever, in the West-Indies, probably originate in its being used in different stages of the disease. Dr. Jackson, of the British army, in his late visit to Philadelphia, informed me, that he had cured nineteen out of twenty of all the soldiers whom he attended, by copious bleeding, provided it was performed within six hours after

the attack of the fever. Beyond that period, it mitigated its force, but seldom cured. The quantity of blood drawn by the doctor, in this early stage of the disease, was always from twenty to thirty ounces. I have said the yellow fever of 1797 was more malignant than the fevers of 1793 and 1794. Its resemblance to the yellow fever in the West-Indies, in not yielding to bleeding after the first day, is a proof of this assertion.

I was struck, during my attendance upon this fever, in observing the analogy between its *mixed* form and the malignant state of the small-pox. The fever, in both, continues for three or four days without any remission. They both have a second stage, in which death usually takes place, if the diseases be left to themselves. By means of copious bleeding in their first, they are generally deprived of their malignity and mortality in their second stage. This remark, so trite in the small-pox, has been less attended to in the yellow fever. The bleeding in the first stage of this disease does not, it is true, destroy it altogether, any more than it destroys an eruption in the second stage of the small-pox, but it weakens it in such a manner that the patient passes through its second stage without pain or danger, and with no other aid from medicine than what is commonly derived from good

nursing, proper aliment, and a little gently opening physic.

It is common with those practitioners who object to bleeding in the yellow fever, to admit it occasionally in *robust* habits. This rule leads to great error in practice. From the weak action of predisposing, or exciting causes, the disease often exists in a feeble state in such habits, while from the protracted or violent operation of the same causes, it appears in great force in persons of delicate constitutions. A physician, therefore, in prescribing for a patient in this fever, should forget the natural strength of his muscles, and accommodate the loss of blood wholly to the morbid strength of his disease.

The quantity of blood drawn in this fever was always proportioned to its violence. I cured many by a single bleeding. A few required the loss of upwards of a hundred ounces of blood to cure them. The persons from whom that large quantity of blood was taken, were, Messieurs Andrew Brown, Horace Hall, George Cummins, J. Ramsay, and George Eyre. But I was not singular in the liberal and frequent use of the lancet. The following physicians drew the quantities of blood annexed to their respective names from the following persons, viz.

Dr. Dewees	176 ounces from	Dr. Physick,
Dr. Griffitts	110	Mr. S. Thomson,
Dr. Stewart	106	Mrs. M'Phail,
Dr. Cooper	150	Mr. David Evans,
Dr. Gillespie	103	himself.

All the above named persons had a rapid and easy recovery, and now enjoy good health. I lost but one patient who had been the subject of early and copious bleeding. His death was evidently induced by a supper of beef-stakes and porter, after he had exhibited the most promising signs of convalescence.

OF PURGING.

From the great difficulty that was found in discharging bile from the bowels, by the common modes of administering purges, Dr. Griffitts suggested to me the propriety of giving large doses of calomel, without jalap or any other purging medicine, in order to loosen the bile from its close connection with the gall-bladder and duodenum, during the first day of the disease. This method of

discharging acrid bile was found useful. I observed the same relief from large evacuations of fœtid bile, in the epidemic of 1797, that I have remarked in the fever of 1793. Mr. Bryce has taken notice of the same salutary effects from similar evacuations, in the yellow fever on board the Busbridge Indiaman, in the year 1792. His words are: "It was observable, that the more dark-coloured and fœtid such discharges were, the more early and certainly did the symptoms disappear. Their good effects were so instantaneous, that I have often seen a man carried up on deck, perfectly delirious with subsultus tendinum, and in a state of the greatest apparent debility, who, after one or two copious evacuations of this kind, has returned of himself, and astonished at his newly acquired strength*." Very different are the effects of tonic remedies, when given to remove this apparent debility. The clown who supposes the crooked appearance of a stick, when thrust into a pail of water, to be real, does not err more against the laws of light, than that physician errs against a law of the animal economy, who mistakes the debility which arises from oppression for an exhausted state of the system, and attempts to remove it by stimulating medicines.

* Annals of Medicine, p. 123.

After unlocking the bowels, by means of calomel and jalap, in the beginning of the fever, I found no difficulty afterwards in keeping them gently open by more lenient purges. In addition to those which I have mentioned in the account of the fever of 1793, I yielded to the advice of Dr. Griffitts, by adopting the soluble tartar, and gave small doses of it daily in many cases. It seldom offended the stomach, and generally operated, without griping, in the most plentiful manner.

However powerful bleeding and purging were in the cure of this fever, they often required the aid of a *salivation* to assist them in subduing it.

Besides the usual methods of introducing mercury into the system, Dr. Stewart accelerated its action, by obliging his patients to wear socks filled with mercurial ointment; and Dr. Gillespie aimed at the same thing, by injecting the ointment, in a suitable vehicle, into the bowels, in the form of glysters.

The following fact, communicated to me by Dr. Stewart, will show the safety of large doses of calomel in this fever. Mrs. M'Phail took 60 grains of calomel, by mistake, at a dose, after having taken three or four doses, of 20 grains each, on the same

day. She took, in all, 356 grains in six days, and yet, says the doctor, "such was the state of her stomach and intestines, that that large quantity was retained without producing the least griping, or more stools than she had when she took three grains every two hours."

I observed the mercury to affect the mouth and throat in the following ways. 1. It sometimes produced a swelling only in the throat, resembling a common inflammatory angina. 2. It sometimes produced ulcers upon the lips, cheeks, and tongue, without any discharge from the salivary glands. 3. It sometimes produced swellings and ulcers in the gums, and loosened the teeth without inducing a salivation. 4. There were instances in which the mercury induced a rigidity in the masseter muscles of the jaw, by which means the mouth was kept constantly open, or so much closed, as to render it difficult for the patient to take food, and impossible for him to masticate it. 5. It sometimes affected the salivary glands only, producing from them a copious secretion and excretion of saliva. But, 6. It more frequently acted upon all the above parts, and it was then it produced most speedily its salutary effects. 7. The discharge of the saliva frequently took place only during the remission or intermission of the fever, and ceased with each re-

turn of its paroxysms. 8. The salivation did not take place, in some cases, until the solution of the fever. This was more especially the case in those forms of the fever in which there were no remissions or intermissions. 9. It ceased in most cases with the fever, but it sometimes continued for six weeks or two months after the complete recovery of the patient. 10. The mercury rarely dislodged the teeth. Not a single instance occurred of a patient losing a tooth in the city hospital, where the physicians, Dr. J. Duffield informed me, relied chiefly upon a salivation for a cure of the fever. 11. Sometimes the mercury produced a discharge of blood with the saliva. Dr. Coulter, of Baltimore, gave me an account, in a letter dated the 17th of September, 1797, of a boy in whom a hæmorrhage from the salivary glands, excited by calomel, was succeeded by a plentiful flow of saliva, which saved his patient. I saw no inconvenience from the mixture of blood with saliva in any of my patients. It occurred in Dr. Caldwell, Mr. Bradford, Mr. Brown, and several others.

It has been said that mercury does no service unless it purges or salivates. I am disposed to believe that it may act as a counter stimulus to that of the miasmata of the yellow fever, and thus be useful without producing any evacuation from the

bowels or mouth. It more certainly acts in this way, provided blood-letting has preceded its exhibition. I have supposed the stimulus from the remote cause of the yellow fever to be equal in force to five, and that of mercury to three. To enable the mercury to produce its action upon the system, it is necessary to reduce the febrile action, by bleeding, to two and a half, or below it, so that the stimulus of the mercury shall transcend it. The safety of mercury, when introduced into the system, has three advantages as a stimulus over that of the matter which produces the fever. 1. It excites an action in the system preternatural only in *force*. It does not derange the *natural* order of actions. 2. It determines the actions chiefly to external parts of the body. And, 3. It fixes them, when it affects the mouth and throat, upon parts which are capable of bearing great inflammation and effusion without any danger to life. The stimulus which produces the yellow fever acts in ways the reverse of those which have been mentioned. It produces violent *irregular* or *wrong* actions. It determines them to internal parts of the body, and it fixes them upon viscera which bear, with difficulty and danger, the usual effects of disease. A late French writer, Dr. Fabre, ascribed to diseases a centrifugal, and a centripetal direction. From what has been said it

would seem, the former belongs to mercury, and the latter to the yellow fever.

Considering the great prejudices against blood-letting, I have wished to combat this fever with mercury alone. But, for reasons formerly given, I have been afraid to trust to it without the assistance of the lancet. The character of the fever, moreover, like that which the poet has ascribed to Achilles, is of " so swift, irritable, inexorable, and " cruel" a nature, that it would be unsafe to rely exclusively upon a medicine which is not only of less efficacy than bleeding, but often slow and uncertain in its operation, *more especially* upon the throat and mouth.

Let not the reader be offended at my attempts to reason. I am aware of the evils which the weak and perverted exercise of this power of the mind has introduced into medicine. But let us act with the same consistency upon this subject that we do in other things.

We do not consign a child to its cradle for life, because it falls in its first unsuccessful efforts to use its legs. In like manner we must not abandon reason, because, in our first efforts to use it, we have been deceived. A single just principle in our

science will lead to more truth, in one year, than whole volumes of uncombined facts will do in a century.

I lost but two patients in this epidemic in whom the mercury excited a salivation. One of them died from the want of nursing; the other by the late application of the remedy.

OF EMETICS.

It was said a practitioner, who was opposed to bleeding and mercury, cured this fever by means of strong emetics. I gave one to a man who refused to be bled. It operated freely, and brought on a plentiful sweat. The next day he arose from his bed, and went to his work. On the fourth day he sent for me again. My son visited him, and found him without a pulse. He died the next day.

I heard of two other persons who took emetics in the beginning of the fever, without the advice of a physician, both of whom died.

Dr. Pinckard informed me, that their effects were generally hurtful in the violent grades of the yellow fever in the West-Indies. The same information has since been given to me by Dr. Jackson. In the second and third grades of the bilious fever they appear not only to be safe, but useful.

OF DIET AND DRINKS.

The advantages of a weak vegetable diet were very great in this fever. I found but little difficulty, in most cases, in having my prohibition of animal food complied with before the crisis of the fever, but there was often such a sudden excitement of the appetite for it, immediately afterwards, that it was difficult to restrain it. I have mentioned the case of a young man, who was upon the recovery, who died in consequence of supping upon beef-stakes. Many other instances of the mortality of this fever from a similar cause, I believe, occurred in our epidemic, which were concealed from our physicians. I am not singular in ascribing the death of convalescents to the too early use of animal food. Dr. Poissonnier has the following im-

portant remark upon this subject. "The physicians of Brest have observed, that the relapses in the malignant fever, which prevailed in their naval hospitals, were as much the effect of a fault in the diet of the sick as of the contagious air to which they were exposed, and that as many patients perished from this cause as from the original fever. For this reason light soups, with leguminous vegetables in them, panada, rice seasoned with cinnamon, fresh eggs, &c. are all that they should be permitted to eat. The use of flesh should be forbidden for many days after the entire cure of the disorder*."

Dr. Huxham has furnished another evidence of the danger from the premature use of animal food, in his history of a malignant fever which prevailed at Plymouth, in the year 1740. "If any one (says the doctor) made use of a flesh or fish diet, before he had been very well purged, and his recovery confirmed, he infallibly indulged himself herein at the utmost danger of his life†."

In addition to the mild articles of diet, mentioned by Dr. Poissonnier, I found bread and milk,

* Maladies de Gens de Mer, vol. i. p. 345.

† Epidemics, vol. ii. p. 67.

with a little water, sugar, and the pulp of a roasted apple mixed with it, very acceptable to my patients during their convalescence. Oysters were equally innocent and agreeable. Ripe grapes were devoured by them with avidity, in every stage of the fever. The season had been favourable to the perfection of this pleasant fruit, and all the gardens in the city and neighbourhood in which it was cultivated were gratuitously opened by the citizens for the benefit of the sick.

The drinks were, cold water, toast and water, balm tea, water in which jellies of different kinds had been dissolved, lemonade, apple water, barley and rice water, and, in cases where the stomach was affected with sickness or puking, weak porter and water, and cold camomile tea. In the convalescent stage of the fever, and in such of its remissions or intermissions as were accompanied with great languor in the pulse, wine-whey, porter and water, and brandy and water, were taken with advantage.

Cold water applied to the body, cool and fresh air, and cleanliness, produced their usual good effects in this fever. In the external use of cold water, care was taken to confine it to such cases as were accompanied with preternatural heat, and to

forbid it in the cold fit of the fever, and in those cases which were attended with cold hands and feet, and where the disease showed a disposition to terminate, in its first stage, by a profuse perspiration. It has lately given me great pleasure to find the same practice, in the external use of cold water in fevers, recommended by Dr. Currie of Liverpool, in his medical reports of the effects of water, cold and warm, as a remedy in febrile diseases. Of the benefit of fresh air in this fever, Dr. Dawson of Tortola has lately furnished me with a striking instance. He informed me, that by removing patients from the low grounds on that island, where the fever is generated, to a neighbouring mountain, they generally recovered in a few days.

Finding a disagreeable smell to arise from vinegar sprinkled upon the floor, after it had emitted all its acid vapour, I directed the floors of sick rooms to be sprinkled only with water. I found the vapour which arose from it to be grateful to my patients. A citizen of Philadelphia, whose whole family recovered from the fever, thought he perceived evident advantages from tubs of fresh water being kept constantly in the sick rooms.

OF TONIC REMEDIES.

There were now and then remissions and intermissions of the fever, accompanied with such signs of danger from debility, as to render the exhibition of a few drops of laudanum, a little wine-whey, a glass of brandy and water, and, in some instances, a cup of weak chicken-broth, highly necessary and useful. In addition to these cordial drinks, I directed the feet to be placed in a tub of warm water, which was introduced under the bed-clothes, so that the patient was not weakened by being raised from a horizontal posture. All these remedies were laid aside upon the return of a paroxysm of fever.

I did not prescribe bark in a single case of this disease. An infusion of the quassia root was substituted in its room, in several instances, with advantage.

Blisters were applied as usual, but, from the insensibility of the skin, they were less effectual than applications of mustard to the arms and legs. It is a circumstance worthy of notice, that while the stomach, bowels, and even the large blood-vessels are sometimes in a highly excited state, and

overcharged, as it were, with life, the whole surface of the body is in a state of the greatest torpor. To attempt to excite it by internal remedies is like adding fuel to a chimney already on fire. The excitement of the blood-vessels, and the circulation of the blood, can only be equalized by the application of stimulants to the skin. These, to be effectual, should be of the most powerful kind. Caustics might probably be used in such cases with advantage. I am led to this opinion by a fact communicated to me by Dr. Stewart. A lighted candle, which had been left on the bed of a woman whom he was attending in the apparent last stage of the yellow fever, fell upon her breast. She was too insensible to feel, or too weak to remove it. Before her nurse came into her room, it had made a deep and extensive impression upon her flesh. From that time she revived, and in the course of a few days recovered. As a tonic remedy in this fever, Dr. Jackson has spoken to me in high terms of the good effects of riding in a carriage. Patients, he informed me, who were moved with difficulty, after riding a few miles were able to sit up, and, when they returned from their excursions, were frequently able to walk to their beds.

Much has been said, of late years, in favour of the application of warm olive oil to the body in the

plague, and a wish has been expressed, by some people, that its efficacy might be tried in the yellow fever. Upon examining the account of this remedy, as published by Mr. Baldwin, three things suggest themselves to our notice. 1. That the oil is effectual only in the *forming* state of the disease; 2. That the friction which is used with it contributes to excite the torpid vessels of the skin; and 3. That it acts chiefly by depleting from the pores of the body. From the unity of the remedy of depletion, it is probable purging or bleeding might be substituted to the expensive parade of the sweat induced by the warm oil, and the smoke of odoriferous vegetables. But I must not conceal here, that there are facts which favour an idea, that oil produces a sedative action upon the blood-vessels, through the medium of the skin. Bontius says it is used in this manner in the East-Indies, for the cure of malignant fevers, after the previous use of bleeding and purging. It seems to have been a remedy well known among the Jews; hence we find the apostle James advises its being applied to the body, in addition to the prayers of the elders of the church*. It is thus in other cases, the blessings of Heaven are conveyed to men through the use of natural means.

* Chapter v. verse 14.

During the existence of the premonitory symptoms, and before patients were confined to their rooms, a gentle purge, or the loss of a few ounces of blood, in many hundred instances, prevented the formation of the fever. I did not meet with a single exception to this remark.

Fevers are the affliction chiefly of poor people. To prevent or to cure them, remedies must be cheap, and capable of being applied with but little attendance. From the affinity established by the Creator between evil and its antidotes, in other parts of his works, I am disposed to believe no remedy will ever be effectual in any general disease, that is not cheap, and that cannot easily be made universal.

It is to be lamented that the greatest part of all the deaths which occur, are from diseases that are under the power of medicine. To prevent their fatal issue, it would seem to be agreeable to the order of Heaven in other things, that they should be attacked in their forming state. Weeds, vermin, public oppression, and private vice, are easily eradicated and destroyed, if opposed by their proper remedies, as soon as they show themselves. The principal obstacle to the successful use of the antidotes of malignant fevers, in their early stage, arises from physicians refusing to declare when

they appear in a city, and from their practice of calling their mild forms by other names than that of a mortal epidemic.

I shall now say a few words upon the success of the depleting practice in this epidemic.

From the more malignant state of the fever, and from the fears and prejudices that were excited against bleeding and mercury by means of the newspapers, the success of those remedies was much less than in the years 1793 and 1794. Hundreds refused to submit to them at the *time*, and in the *manner*, that were necessary to render them effectual. From the publications of a number of physicians, who used the lancet and mercury in their greatest extent, it appears that they lost but one in ten of all they attended. It was said of several practitioners who were opposed to copious bleeding, that they lost a much smaller proportion of their patients with the prevailing fever. Upon inquiry, it appeared they had lost many more. To conceal their want of success, they said their patients had died of other diseases. This mode of deceiving the public began in 1793. The men who used it did not recollect, that it is less in favour of a physician's skill to lose patients in pleurisies, colics,

hæmorrhages, contusions, and common remittents, than in a malignant yellow fever.

Dr. Sayre attended fifteen patients in the disease, all of whom recovered by the plentiful use of the depleting remedies. His place of residence being remote from those parts of the city in which the fever prevailed most, prevented his being called to a greater number of cases.

A French physician, who bled and purged *moderately*, candidly acknowledged that he saved but three out of four of his patients.

In the city hospital, where bleeding was sparingly used, and where the physicians depended chiefly upon a salivation, more than one half died of all the patients who were admitted. It is an act of justice to the physicians of the hospital to add, that many, perhaps most of their patients, were admitted *after* the first day of the disease.

I cannot conclude this comparative view of the success of the different modes of treating the yellow fever, without taking notice, that the stimulating mode, as recommended by Dr. Kuhn and Dr. Stevens, in the year 1793, was deserted by every physician in the city. Dr. Stevens acknowledged

the disease to require a different treatment from that which it required in the West-Indies; Dr. Kuhn adopted the lancet and mercury in his practice; and several other physicians, who had written against those remedies, or who had doubted of their safety and efficacy, in 1793, used them with confidence, and in the most liberal manner, in 1797.

In the histories I have given of the yellow fevers of 1793 and 1794, I have scattered here and there a few observations upon their degrees of danger, and the signs of their favourable or unfavourable issue. I shall close the present history, by collecting those observations into one view, and adding to them such other signs as have occurred to me in observing this epidemic.

Signs of moderate danger, and a favourable issue of the yellow fever.

1. A chilly fit accompanying the attack of the fever. The longer this chill continues, the more favourable the disease.

2. The recurrence of chills every day, or twice a day, or every other day, with the return of the exacerbations of the fever. A coldness of the whole body, at the above periods, without chills, a

coldness with a profuse sweat, cold feet and hands, with febrile heat in other parts of the body, and a profuse sweat without chills or coldness, are all less favourable symptoms than a regular chilly fit, but they indicate less danger than their total absence during the course of the fever.

3. A puking of *green* or *yellow* bile on the first day of the disease is favourable. A discharge of black bile, if it occur on the *first* day of the fever, is not unfavourable.

4. A discharge of green and yellow stools. It is more favourable if the stools are of a dark or black colour, and of a fœtid and acrid nature, on the first or second day of the fever.

5. A softness and moisture on the skin in the beginning of the fever.

6. A sense of pain in the head, or a sudden translation of pain from internal to external parts of the body, particularly to the back. An increase of pain after bleeding.

7. A sore mouth.

8. A moist white, or a yellow tongue.

9. An early disposition to spit freely, whether excited by nature or the use of mercury.

10. Blood becoming sizy, after having exhibited the usual marks of great morbid action in the blood-vessels.

11. Great and exquisite sensibility in the sense of feeling coming on near the close of the fever.

12. Acute pains in the back and limbs.

13. The appearance of an inflammatory spot on a finger or toe, Dr. H. M'Clen says, is favourable. It appears, the doctor says, as if the cause of the fever had escaped by explosion.

Signs of great danger, and of an unfavourable issue of the yellow fever are,

1. An attack of the fever, suddenly succeeding great terror, anger, or the intemperate use of venery, or strong drink.

2. The first paroxysm coming on without any premonitory symptoms, or a chilly fit.

3. A coldness over the whole body without chills for two or three days.

4. A sleepiness on the first and second days of the fever.

5. Uncommon paleness of the face not induced by blood-letting.

6. Constant or violent vomiting, without any discharge of bile.

7. Obstinate costiveness, or a discharge of natural, or white stools; also quick, watery stools after taking drink.

8. A diarrhœa towards the close of the fever. I lost two patients, in 1797, with this symptom, who had exhibited, a few days before, signs of a recovery. Dr. Pinckard informed me, that it was generally attended with a fatal issue in the yellow fever of the West-Indies. Diemerbroeck declares, that "scarcely one in a hundred recovered, with this symptom, from the plague*."

9. A suppression of urine. It is most alarming when it is without pain.

* Lib. i. cap. 15.

10. A discharge of dark-coloured and bloody urine.

11. A cold, cool, dry, smooth, or shining skin.

12. The appearance of a yellow colour in the face on the first or second day of the fever.

13. The absence of pain, or a sudden cessation of it, with the common symptoms of great danger.

14. A disposition to faint upon a little motion, and fainting after losing but a few ounces of blood.

15. A watery, glassy, or brilliant eye. A red eye on the fourth or fifth day of the disease. It is more alarming if it become so after having been previously yellow.

16. Imperfect vision, and blindness in the close of the disease.

17. Deafness.

18. A preternatural appetite, more especially in the last stage of the fever.

19. A slow, intermitting, and shattered pulse.

20. Great restlessness, delirium, and long continued coma.

21. A discharge of coffee-coloured or black matter from the stomach, after the fourth day of the fever.

22. A smooth red tongue, covered with a lead-coloured crust, while its edges are of a bright red.

23. A dull vacant face, expressive of distress.

24. Great insensibility to common occurrences, and an indifference about the issue of the disease.

25. Uncommon serenity of mind, accompanied with an unusually placid countenance.

I shall conclude this head by the following remarks:

1. The violence, danger, and probable issue of this fever, seem to be in proportion to the duration and force of the predisposing and exciting causes. However steady the former are in bringing on debility, and the latter in acting as irritants upon accumulated excitability, yet a knowledge of their duration and force is always useful, not only in

forming an opinion of the probable issue of the fever, but in regulating the force of remedies.

2. The signs of danger vary in different years, from the influence of the weather upon the disease.

3. Notwithstanding the signs of the favourable and unfavourable issue of the fever are in general uniform, when the cure of the disease is committed to nature, or to tonic medicines, yet they are far from being so when the treatment of the fever is taken out of the hands of nature, and attempted by the use of depleting remedies. We often see patients recover with nearly all the unfavourable symptoms that have been mentioned, and we sometimes see them die, with all those that are favourable. The words of Morellus, therefore, which he has applied to the plague, are equally true when applied to the yellow fever. "In the plague, our senses deceive us. Reason deceives us. The aphorisms of Hippocrates deceive us*." An important lesson may be learned from these facts, and that is, never to give a patient over. On the contrary, it is our duty in this, as well as in all other acute diseases, to dispute every inch of ground with

* De Feb. Pestilent. cap. v. "Acutorum morborum incertæ admodum, ac fallaces sunt prædictiones."

HIPPOCRATES.

death. By means of this practice, which is warranted by science, as well as dictated by humanity, the grave has often been deprived for a while of its prey, and a prelude thereby exhibited of that approaching and delightful time foretold by ancient prophets, when the power of medicine over diseases shall be such, as to render old age the only outlet of human life.

AN ACCOUNT

OF THE

BILIOUS YELLOW FEVER,

AS IT

APPEARED IN PHILADELPHIA,

IN THE YEAR 1798.

AN ACCOUNT, &c.

THE yellow fever of the year 1797 was succeeded by scarlatina, catarrhs, and bilious pleurisies, in the months of November and December of the same year. The weather favoured the generation of the latter diseases. It became suddenly cold about the middle of November. On the 5th of December, the navigation of the Delaware was obstructed. There was a thaw on the 13th and 14th of this month, but not sufficient to open the river.

In the month of January, 1798, the fevers discovered an uncommon determination to the brain. Four cases of the hydrocephalic state of fever occurred under my care during this month, all of which yielded to depleting remedies. The subjects of this state of fever were Mr. Robert Lewis,

and the daughters of Messrs. John Brooks, Andrew Ellicott, and David Maffat.

The weather was variable during the months of February and March. The navigation of the Delaware was not completely opened until the latter end of February. The diseases of these two months were catarrhs and bilious pleurisies. The former were confined chiefly to children, and were cured by gentle pukes, purges of calomel, and blood-letting. The last remedy was employed twice in a child of Isaac Pisso, of six weeks old, and once in a child of Thomas Billington, of three weeks old, with success.

On the 7th of April, I visited Mr. Pollock, lately from the state of Georgia, in consultation with Dr. Physick, in a yellow fever. He died the evening after I saw him, on the third day of his disease.

There was a snow storm on the 16th of April, and the weather was afterwards very cold. Such leaves and blossoms as had appeared, were injured by it.

On the 1st of May, the mercury in Fahrenheit's thermometer rose to 84°. The weather, during the latter part of this month, and in June, was very

dry. On the 6th of June, Dr. Cooper lost a patient in the yellow fever, near the corner of Twelfth and Walnut-streets. Mark Miller died with the same state of fever on the 2d of July. About a dozen cases of a similar nature occurred, under the care of different practitioners, between the 2d and 20th of this month, and all of them in parts of the city remote from Water-street.

On the 19th of July, the weather was so cool as to render winter clothes comfortable. A severe hail storm had occurred, a few days before, in the neighbourhood of Wilmington, in the Delaware state.

On the 21st of the month, the ship Deborah arrived from one of the West-India islands, and discharged her cargo in the city. She was moored afterwards at Kensington, where the foul air which was emitted from her hold produced several cases of yellow fever, near the shores of that village.

In August the disease appeared in nearly every part of the city, and particularly in places where there was the greatest exhalation from foul gutters and common sewers.

In describing the disease, as it appeared this year, I shall take notice of its symptoms as they appeared in the blood-vessels, alimentary canal, the tongue, the nervous system, in the eyes, the lymphatic system, and the blood.

The subjects which furnished the materials for this history were not only private patients, but the poor in the city hospital, who were committed to the care of Dr. Physick and myself, by the board of health.

I. The pulse was, in many cases, less active in the beginning of this fever than in former years. It was seldom preternaturally slow. It resembled the pulse which occurs in the first stage of the common jail fever. Hæmorrhages were common about the fourth and fifth days, and generally from the gums, throat, or stomach.

II. The whole alimentary canal was much affected in most cases. Costiveness and a vomiting were general. The alvine discharges were occasionally green, dark-coloured, black, and natural. The black vomiting was more common this year than in former years, in all the forms of the fever. It was sometimes suspended for several days before death, and hopes were entertained of a recovery of

patients in whom it had appeared. In a boy, at the city hospital, it ceased ten days before he died. It was sometimes succeeded by delirium or coma, but it more commonly left the patient free of pain, and in the possession of all the faculties of his mind.

III. The tongue was by no means an index of the state of the fever, as in the years 1793 and 1797. I saw several deaths, attended with a black vomiting, in which the tongue retained a natural appearance. This phenomenon at first deceived me. I ascribed it to such a concentration of the disease in the stomach and other vital parts, as to prevent its diffusing itself through the external parts of the system. We observe the effects of the same cause in a natural state of the skin, and in a natural appearance of the urine, in the most malignant forms of this fever.

IV. In the nervous system, the disease appeared with several new symptoms. A relation of Peter Field attempted to bite his attendants in the delirium of his fever, just before he died.

I attended a young woman at Mrs. Easby's, who started every time I touched her pulse. Loud talking, or a question suddenly proposed to her, produced the same convulsive motion. She retain-

ed her reason during the whole of her illness, and was cured by bleeding and a salivation.

Hiccup was a common symptom. I saw but two patients recover who had it. In one of them, Dr. Hedges, it came on after the sixth day of the fever, and continued, without any other symptom of disease, for four or five days.

I lost a patient who complained of no pain but in the calves of his legs. Dr. Physick lost a girl, in the city hospital, who complained only of pains in her toes. Her stomach discovered, after death, strong marks of inflammation.

Many people passed through every stage of the disease, without uttering a complaint of pain of any kind.

An uncommon stiffness in the limbs preceded death a few hours, in several cases. This stiffness ceased, in one of Dr. Physick's patients, immediately after death, but returned as soon as he became cold.

An obstinate wakefulness continued through the whole of the disease in Dr. Leib. It was common during the convalescence, in many cases.

The whole body was affected, in many cases, with a morbid sensibility, or what has been called supersensation, so that patients complained of pain upon being touched, when they were moved in their beds. This extreme sensibility was general in parts to which blisters had been applied. It continued through every stage of the disease. Dr. Physick informed me, that he observed it in a man two hours before he died. In this man there was an absence of pulse, and a coldness of his extremities. Upon touching his wrist, he cried out, as if he felt great pain.

V. A redness in the eyes was a general symptom. I saw few recoveries where this redness was not removed.

A discharge of matter from one ear relieved Mr. J. C. Warren from a distressing pulsation of the arteries in his head.

VI. Glandular swellings occurred in several instances. Two cases of them came under my notice. They both terminated favourably.

VII. The blood had its usual appearances in this disease. In the yellow fever which prevailed at

the same time in Boston, Dr. Rand says the blood was sizy in but one out of a hundred cases.

The forms of the fever were nearly similar to those which have been described in the year 1797. I saw several cases in which the disease appeared in the form of a tertian fever. In one of them it terminated in death.

The system, in many cases, was prostrated below the point of inflammatory re-action. These were called, by some practitioners, typhous fevers. It was the most dangerous and fatal form of the disease. Its frequent occurrence gave occasion to a remark, that our epidemic resembled the yellow fever of the West-Indies, much more than the fevers of 1793 and 1797.

I attended two patients in whom the disease was protracted nearly to the 30th day. They both recovered.

Dr. Francis Sayre informed me, that he saw a child, in which the morbid affection of the windpipe, called cynanche trachealis, appeared with all the usual symptoms of yellow fever.

I attended one case in which the force of the disease was weakened, in its first stage, by a profuse hæmorrhage from the bowels. This hæmorrhage was followed by a bloody diarrhœa, which continued for four or five weeks.

Persons of all ages and colours were affected by this fever. I saw a case of it in a child of six months old. In the blacks, it was attended with less violence and mortality than in white people. It affected many persons who had previously had it.

The disease was excited by the same causes which excited it in former years. I observed a number of people to be affected by the fever, who lived in solitude in their houses, without doing any business. The system, in these persons, was predisposed to the disease, by the debility induced by ceasing to labour at their former occupations. It was excited in a young man by a fractured leg. He died five days afterwards, with a black vomiting. I observed, in several instances, an interval of four and five days between the debility induced upon the system by a predisposing, and the action of an exciting cause. Dr. Clark says, he has seen an interval of several weeks between the operation of those causes, in the yellow fever of Dominique.

These facts are worthy of notice, as they lead to a protracted use of the means of obviating an attack of the disease.

During my attendance upon the sick, I twice perceived in my system the premonitory signs of the epidemic. Its complete formation was prevented each time by rest, a moderate dose of physic, and a plentiful sweat.

I shall now take notice of the different manner in which patients died of this fever. The detail may be useful, by unfolding new principles in the animal economy, as well as new facts in the history of the disease.

1. The disease terminated in death, in some instances, by means of convulsions.

2. By delirium, which prompted to exertions and actions similar to those which take place in madness.

3. By profuse hæmorrhages from the gums. This occurred in two patients of Dr. Stewart.

4. By an incessant vomiting and hiccup.

5. By extreme pain in the calves of the legs and toes, which, by destroying the excitement of the system, destroyed life.

6. By a total absence of pain. In this way it put an end to the life of Mr. Henry Hill.

7. By a disposition to easy, and apparently natural sleep. I have reason to believe that Mr. Hill encouraged this disposition to sleep, a few hours before he died, under the influence of a belief that he would be refreshed by it. Diemerbroeck says the plague often killed in the same way.

8. The mind was in many cases torpid, where no delirium attended, and death was submitted to with a degree of insensibility, which was often mistaken for fortitude and resignation.

I shall now mention the morbid appearances exhibited by the bodies of persons who died of this fever, as communicated to me by my friend, Dr. Physick; being the result of numerous dissections made by him at the city hospital.

In all of them the stomach was inflamed. The matter which constitutes what is called the *black vomit*, was found in the stomachs of several patients

who had not discharged it at any time by vomiting. In some stomachs, he found lines which seemed to separate the living from their dead parts. Those parts, though dead, were not always in a mortified state. They were distinguished from the living parts by a peculiar paleness, and by discovering a weak texture upon being pressed between the fingers. He observed the greatest marks of inflammation in the stomachs of several persons in whom there had been no vomiting, during the whole course of the disease. The brain, in a few instances, discovered marks of inflammation. Water was now and then found in its ventricles, but always of its natural colour, even in those persons whose skins were yellow. The liver suffered but little in this disease. It may serve to increase our knowledge of the influence of local circumstances upon epidemics to remark, that this viscus, which was rarely diseased in the fever of Philadelphia in 1798, discovered marks of great inflammation in the bodies which were examined by Dr. Rand and Dr. Warren, in the town of Boston, where the yellow fever prevailed at the same time it did in Philadelphia.

The weather was hot and dry in August and September, during the prevalence of this fever. Its influence upon animal and vegetable life are worthy

of notice. Moschetoes abounded, as usual in sickly seasons; grasshoppers covered the ground in many places; cabbages and other garden vegetables, and even fields of clover, were devoured by them. Peaches ripened this year three weeks sooner than in ordinary summers, and apples rotted much sooner than usual after being gathered in the autumn. Many fruit-trees blossomed in October, and a second crop of small apples and cherries were seen in November, on the west side of Schuylkill, near the city. Meteors were observed in several places. On the 29th of September there was a white frost. Its effects upon the fever were obvious and general. It declined, in every part of the city, to such a degree as to induce many people to return from the country. In the beginning of October the weather again became warm, and the disease revived. It was observable, that all great changes in the weather from heat to cold that were short of frost, or of cold to heat, increased the mortality of the fever. It spread most rapidly in moist weather.

The origin of this fever was from the exhalations of gutters, docks, cellars, common sewers, ponds of stagnating water, and from the foul air of the ship formerly mentioned.

The fever prevailed at the same time in the town of Chester, in Pennsylvania; in Wilmington, in the state of Delaware; in New-York; in New-London, in Connecticut; in Windsor, in Vermont; and in Boston; in all which places its origin was traced to domestic sources.

I shall now deliver a short account of the remedies employed in the cure of this disease.

I have said that the pulse was less active in this fever than in the fevers of former years. It was seldom, however, so feeble as to forbid bleeding. In Dr. Mease it called for the loss of 162 ounces of blood, and in Mr. J. C. Warren for the loss of 200, by successive bleedings, before it was subdued. But such cases were not common. In most of them, the pulse flagged after two or three bleedings. But there were cases in which the lancet was forbidden altogether. In these, the system appeared to be prostrated, by the force of the miasmata, below the point of re-action. This state of the disease manifested itself in a weak, quick, and frequent pulse, languid eye, sighing, great inquietude, or great insensibility. However unsafe bleeding was on the first day of this fever, when it appeared with those symptoms, nature often per-

formed that operation upon herself from the gums, on the fourth or fifth day. I saw several pounds of blood discharged on those days, and in that way, with the happiest effects. It appeared to take place after the revival of the blood-vessels from their prostrated state.

From a conviction that the system was depressed only in these cases, and finding that it did not rise upon blood-letting, I resolved to try the effects of emetics, in exciting and equalizing the action of the blood-vessels. The experience I had had of the inefficacy of this remedy in 1793, and of its ill effects in one instance in 1797, led me to exhibit it with a trembling hand. I gave it for the first time to a son of Richard Renshaw. I had bled him but once, and had in vain tried to bring on a salivation. On the fifth day of his disease, his pulse became languid and slow, his skin cool, a hæmorrhage had taken place from his gums, and he discovered a restlessness and anxiety which I had often seen a few hours before death. He took four grains of tartar emetic, with twenty grains of calomel, at two doses. They operated powerfully, upwards and downwards, and brought away a large quantity of bile. The effects of this medicine were such as I wished. The next day he was out of danger. I prescribed the same medicine in

many other cases with the same success. To several of my patients I gave two emetics in the course of the disease. Some of them discharged bile resembling in viscidity the white of an egg. But I saw one case in which great relief was obtained from the operation of an emetic, where no bile was discharged.

In the exhibition of this remedy, I was regulated by the pulse. If I found it languid on the first day of the fever, I gave it before any other medicine. When it was full and tense, I deferred it until I had reduced the pulse to the emetic point by bleeding and purges. I observed, with great pleasure, that mercury affected the mouth more speedily and certainly where an emetic had been administered, than in other cases, probably from awakening, by its stimulus, the sensibility of the stomach; for such was its torpor, that in one case ten grains of tartar emetic, and in another thirty grains, did not operate upon it, so as to excite even the slightest degree of nausea.

In many cases, an emetic, given in the forming state of the disease, seemed to effect an immediate cure.

Purges produced the same salutary effects that they did in former years. I always combined calomel with them in the first stage of the disease.

A salivation was found to be the most certain remedy of any that was used in this fever. I did not lose a single patient, in whom the mercury acted upon the salivary glands. It was difficult to excite it in many cases, from the mercury being rejected by the stomach, from its passing off by the bowels, or from its stimulus being exceeded by the morbid action in the blood-vessels.

Bleeding rendered the action of the mercury upon the mouth more speedy and more certain, but I saw several cases in which a salivation was excited in the most malignant forms of the fever, where no blood had been drawn. It will not be difficult to explain the reason of this fact if we recur to what was said formerly of the prostration of the system in this fever. In its worst forms, there is often a total absence, or a feeble degree of action in the blood-vessels, from an excess of the stimulus of the remote cause of the fever. Here the mercury meets with no resistance in its tendency to the mouth. Bleeding in this case would probably do harm, by taking off a part of the pressure upon the system, and thereby produce a re-action in the

vessels, that might predominate over the action of the mercury. The disease here does that for us by its force, which, in other cases, we effect by depleting remedies.

Where the mercury showed a disposition to pass too rapidly through the bowels, I observed no inconvenience from combining it with opium, in my attempts to excite a salivation. The calomel was constantly aided by mercurial ointment, applied by friction to different parts of the body.

Now and then a salivation continued for weeks and months after the crisis of this fever, to the great distress of the patient, and injury of the credit of mercury as a remedy in this disease. Dr. Physick has discovered, that in these cases the salivation is kept up by carious teeth or bone, and that it is to be cured only by removing them.

From the impracticability of exciting a salivation in all cases, I attempted the cure of this fever, after bleeding, by means of copious sweats. They succeeded in several instances where no other remedy promised or afforded any relief. They were excited by wrapping the patient in a blanket, with half a dozen hot bricks wetted with vinegar, and applied to different parts of the body. The sweat-

ing was continued for six hours, and repeated daily for four or five days.

In those cases where the fever put on the form of an intermittent, I gave bark after bleeding and purging with advantage. I gave it likewise in all those cases where the fever put on the type of the slow chronic fever. Laudanum was acceptable and useful in many cases of pain, wakefulness, vomiting, and diarrhœa, after the use of depleting remedies.

I applied *blisters* in the usual way in this fever, but I think with less effect than in the yellow fevers of former years.

To relieve a vomiting, which was very distressing in many cases about the fourth and fifth days, I gave a julep, composed of the salt of tartar and laudanum. I also gave Dr. Hosack's anti-emetic medicine, composed of equal parts of lime-water and milk. I do not know that it saved any lives, but I am sure it gave ease by removing a painful symptom, and thus, where it did not cure, lessened the sufferings of the sick.

The diet and drinks were the same in this fever as they were in the fevers formerly described.

Cool air, cold water, and cleanliness produced their usual salutary effects in this fever.

I shall now deliver a short account of the symptoms which indicated a favourable and an unfavourable issue of the disease.

It has been said*, that the signs of danger vary in this fever, from the influence of the weather. The autumn of 1798 confirmed, in many instances, the truth of this remark.

I saw no instance of death where a bleeding occurred from the gums on the fourth or fifth day, provided depleting remedies had been used from the beginning of the disease. Few recovered who had this symptom in 1793.

I saw three recoveries after convulsions in the year 1798. All died who were convulsed in 1793 and 1797.

A dry, hoarse, and sore throat was followed by death in every case in which it occurred in my practice. In the fever of 1793 a sore throat was a favourable sign. It was one of the circumstances

* History of the Fever in 1797.

which determined me to use a salivation in that fever.

The absence of pain was always a bad sign. Small, but frequent stools, and the continuance of a redness in the eyes after the ample use of depleting remedies, were likewise bad signs.

An appetite for food on the fourth or fifth day of the fever, without a remission or cessation of the fever, was always unfavourable.

A want of delicacy, in exposing parts of the body which are usually covered, was a bad symptom. I saw but one recovery where it took place. Boccacio says the same symptom occurred in the plague in Italy. "It suspended (he tells us) all modesty, so that young women, of great rank and delicacy, submitted to be attended, dressed, and even cleansed by male nurses."

I have remarked, in another place, that but two of my patients recovered who had the hiccup.

A dry tongue was a bad sign. I saw but one recovery where it occurred, and none where the tongue was black. A moist and natural tongue, where symptoms of violence or malignity appeared

in other parts of the body, was always followed by a fatal issue of the disease.

A desire to ride out, or to go home, in persons who were absent from their families, was, in every instance where it took place, a fatal symptom. These desires arose from an insensibility to pain, or a false idea of the state of the disease. It existed to such a degree in some of the patients in the city hospital, that they often left their beds, and dressed themselves, in order to go home. All these patients died, and some of them in the act of putting on their clothes.

From the history that has been given of the symptoms, treatment, and prognosis of this fever, we see how imperfect all treatises upon epidemics must be, which are not connected with climate and season. As well might a traveller describe a foreign climate, by the state of the weather, or by the productions of the earth, during a single autumn, as a physician adopt a uniform opinion of the history, treatment, and prognosis of a fever, from its phenomena in any one country, or during a single season.

There were three modes of practice used in this epidemic. The first consisted in the exhibition of

purges of castor oil, salts, and manna, and cooling glysters, and in the use of the warm bath. These remedies were prescribed chiefly by the French physicians. The second consisted in the use of mercury alone, in such doses, and in such a manner, as to excite a salivation. This mode was used chiefly by an itinerant and popular quack. The third mode consisted in using all the remedies which I have mentioned in the account of the treatment of this fever, and accommodating them to the state of the disease. This mode of practice was followed by most of the American physicians.

The first mode of practice was the least successful. It succeeded only in such cases as would probably have cured themselves.

The second mode succeeded in mild cases, and now and then in that malignant state of the fever, in which the action of the blood-vessels was so much prostrated by the force of the miasmata, as to permit the mercury to pass over them, and thus to act upon the salivary glands in the course of four or five days.

The last mode was by far the most successful. It is worthy of notice, that the business and reputation of the physicians, during this epidemic, were

in the inverse ratio of their success. The number of deaths by it amounted to between three and four thousand, among whom were three physicians, and two students of medicine. Its mortality was nearly as great as it was in 1793, and yet the number of people who were affected by it was four times as great in 1793 as it was in 1798, for, in the latter year, the city was deserted by nearly all its inhabitants. The cause of this disproportion of deaths to the number who were sick, was owing to the liberal and general use of the lancet in 1793, and to the publications in 1797 having excited general fears and prejudices against it in 1798. Such was the influence of these publications, that many persons who had recovered from this fever in the two former years, by the use of depleting remedies, deserted the physicians who had prescribed them, and put themselves under the care of physicians of opposite modes of practice. Most of them died. Two of them had been my patients, one of whom had recovered of a third attack of the fever under my care.

AN ACCOUNT

OF THE

BILIOUS YELLOW FEVER,

AS IT

APPEARED IN PHILADELPHIA,

IN THE YEAR 1799.

AN ACCOUNT, &c.

THE diseases which succeeded the fever of 1798, in November and December, were highly inflammatory. A catarrh was nearly universal. Several cases of sore throat, and one of erysipelas, came under my care in the month of November. The weather in December was extremely cold. It was equally so in the beginning of January, 1799, accompanied with several falls of snow.

About the middle of the month, the weather moderated so much, so as to open the navigation of the Delaware. I met with two cases of malignant colic in the latter part of this month, and one of yellow fever. The last was Swen Warner. Dr. Physick, who attended him with me, informed me that he had, nearly at the same time, attended two other persons with the same disease.

The weather was very cold, and bilious pleurisies were common, during the latter part of the month of February.

March was equally cold. The newspapers contained accounts of the winter having been uncommonly severe in Canada, and in several European countries.

The first two weeks in April were still cold. The Delaware, which had been frozen a second time during the winter, was crossed near its origin, on the ice, on the 15th day of this month. The diseases, though fewer than in the winter, were bilious and inflammatory. During this month, I was called to a case of yellow fever, which yielded to copious bleeding, and other depleting medicines.

May was colder than is usual in that month, but very healthy.

In the first week of June, several cases of highly bilious fever came under my care. In one of them, all the usual symptoms of the highest grade of that fever occurred. On the 13th of the month, Dr. Physick informed me, that he had lost a patient with that disease. On the 23d of the same month, Joseph Ashmead, a young merchant, died of it.

Several other cases of the disease occurred between the 20th and 29th days of the month, in different parts of the city. About this time, I was informed that the inhabitants of Keys's-alley had predicted a return of the yellow fever, from the trees before their doors emitting a smell, exactly the same which they perceived just before the breaking out of that disease in 1793.

In July, the city was alarmed, by Dr. Griffitts, with an account of several cases of the fever in Penn-street, near the water. The strictness with which the quarantine law had been executed, for a while rendered this account incredible with many people, and exposed the doctor to a good deal of obloquy. At length a vessel was discovered, that had arrived from one of the West-India islands on the 14th of May, and one day before the quarantine law was put into operation, from which the disease was said to be derived. Upon investigating the state of this vessel, it appeared that she had arrived with a healthy crew, and that no person had been sick on board of her during her voyage.

In the latter part of July and in the beginning of August, the disease gradually disappeared from every part of the city. This circumstance deserves

attention, as it shows the disease did not spread by contagion.

About this time we were informed by the newspapers, that dogs, geese, and other poultry, also that wild pigeons were sickly in many parts of the country, and that fish on the Susquehannah, and oysters in the Delaware bay, were so unpleasant, that the inhabitants declined eating them. At the same time, flies were found dead in great numbers, in the unhealthy parts of the city. The weather was dry in August and September. There was no second crop of grass. The gardens yielded a scanty supply of vegetables, and of an inferior size and quality. Cherries were smaller than usual, and pear and apple-trees dropped their fruits prematurely, in large quantities. The peaches, which arived at maturity, were small and ill-tasted. The grain was in general abundant, and of a good quality. A fly, of an unusual kind, covered the potatoe fields, and devoured, in some instances, the leaves of the potatoe. This fly has lately been used with success in our country, instead of the fly imported from Spain. It is equal to it in every respect. Like the Spanish fly, it sometimes induces strangury.

About the middle of August the disease revived, and appeared in different parts of the city. A publication from the academy of medicine, in which they declared the seeds of the disease to spread from the atmosphere only, produced a sudden flight of the inhabitants. In no year, since the prevalence of the fever, was the desertion of the city so general.

I shall now add a short account of the symptoms and treatment of this epidemic.

The arterial system was in most cases active. I met with a tense pulse in a patient after the appearance of the black vomiting. Delirium was less frequent in adults than in former years. In children there was a great determination of the disease to the brain.

I observed no new symptoms in the stomach and bowels. One of the worst cases of the fever which I saw was accompanied with colic. A girl of Thomas Shortall, who recovered, discharged 9 worms during her fever. It appeared in Mr. Thomas Roan, one of my pupils, in the form of a dysentery.

A stiffness, such as follows death, occurred in several patients in the city hospital before death.

Miss Shortall had an eruption of pimples on her breast, such as I have described in the short account I gave of the yellow fever of 1762 in this city, in my account of the disease in 1793.

The blood exhibited its usual appearances in the yellow fever. It was seldom sizy till towards the close of the disease.

The tongue was generally whitish. Sometimes it was of a red colour, and had a polished appearance. I saw no case of a black tongue, and but few that were yellow before the seventh day of the disease.

The type of this disease was nearly the same as described in 1797. It now and then appeared in the form of a quartan, in which state it generally proved fatal. It appeared with rheumatic pains in one of my patients. It blended itself with gout and small-pox. Its union with the latter disease was evident in two patients in the city hospital, in each of whom the stools were such as were discharged in the most malignant state of the fever.

The remedies for this fever were bleeding, vomits, purges, sweats, and a salivation and blisters.

There were few cases that did not indicate bleeding. It was performed, when proper, in the usual way, and with its usual good effects. It was indicated as much when the disease appeared in the bowels as in the blood-vessels. Mr. Roan, in whom it was accompanied with symptoms of dysentery, lost nearly 200 ounces of blood by twenty-two bleedings.

I found the same benefit from emetics, in this fever, that I did in the fever of 1798. They were never administered except on the first day, before violent action had taken place in the system, or after it was moderated by one or two bleedings.

Purges of calomel and jalap, also castor oil, salts, and injections were prescribed with their usual advantages.

In those cases where the system was prostrated below the point of re-action, I began the cure by sweating. Blankets, with hot bricks wetted with vinegar, and the hot bath, as mentioned formerly, when practicable, were used for this purpose. The latter produced, in a boy of 14 years of age, who came into the city hospital without a pulse, and with a cold skin, in a few hours, a general warmth and an active pulse. The determination

of the disease to the pores was evinced in one of my patients, by her sweating under the use of the above-mentioned remedies, for the first time in her life. A moisture upon her skin had never before been induced, she informed me, even by the warmest day in summer.

The advantages of a salivation were as great as in former years. From the efficacy of bleeding, purges, emetics, and sweating, I had the pleasure of seeing many recoveries before the mercury had time to affect the mouth. In no one case did I rest the cure exclusively upon any one of these remedies. The more numerous the outlets were to convey off superfluous fluids and excitement from the body, the more safe and certain were the recoveries. A vein, the gall-bladder, the bowels, the pores, and the salivary glands were all opened, in succession, in part, or together, according to circumstances, so as to give the disease every possible chance of passing out of the body without injuring or destroying any of its vital parts.

Blisters were applied with advantage. The vomiting and sickness which attend this fever were relieved, in many instances, by a blister to the stomach.

In those cases in which the fever was protracted to the chronic state, bark, wine, laudanum, and æther produced the most salutary effects. I think I saw life recalled, in several cases in which it appeared to be departing, by frequent and liberal doses of the last of those medicines. The bark was given, with safety and advantage, after the seventh day, when the fever assumed the form of an intermittent.

The following symptoms were generally favourable, viz. a bleeding from the mouth and gums, and a disposition to weep, when spoken to in any stage of the fever.

A hoarseness and sore throat indicated a fatal issue of the disease, as it did in 1798. Dr. Physick remarked, that all those persons who sighed after waking suddenly, before they were able to speak, died.

The recurrence of a redness of the eyes, after it had disappeared, or of but one eye, was generally followed by death. I saw but one recovery with a red face.

I saw several persons, a few hours before death, in whom the countenance, tongue, voice, and pulse

were perfectly natural. They complained of no pain, and discovered no distress nor solicitude of mind. Their danger was only to be known by the circumstances which had preceded this apparently healthy and tranquil state of the system. They had all passed through extreme suffering, and some of them had puked black matter.

The success of the mode of practice I have described was the same as in former years, in private families; but in the city hospital, which was again placed under the care of Dr. Physick and myself, there was a very different issue to it, from causes that are too obvious to be mentioned.

There were two opinions given to the public upon the subject of the origin of this fever; the one by the academy of medicine, the other by the college of physicians. The former declared it to be generated in the city, from putrid domestic exhalations, because they saw it only in their vicinity, and discovered no channel by which it could have been derived from a foreign country; the latter asserted it to be "imported, because it had been imported in former years."

AN

ACCOUNT OF SPORADIC CASES

OF

YELLOW FEVER,

AS THEY

APPEARED IN PHILADELPHIA,

IN 1800.

AN ACCOUNT, &c.

THE weather in the month of January was less cold than is common in that month. Catarrhs, the cynanche trachealis, and bilious pleurisies were prevalent in every part of it. A few cases of yellow fever occurred likewise during this month.

Several cases of erysipelas appeared in February.

The month of March was unusually healthy.

The weather was warm in April, and the city as healthy as in March.

It was equally so in May and June. The spring fruits appeared early in the latter month, in large quantities, and were of an excellent quality. Locusts were universal in June. They had not appeared

since the year 1783. A record from the journal of the Swedish missionaries was published at this time, which described their appearance in 1715, in which year it was said to be very healthy.

On the 14th of June there was a severe thunder gust, with more lightning than had been known for seven years before.

There fell, during all the months that have been mentioned, frequent and plentiful showers of rain, which rendered the crops of grass luxuriant in the neighbourhood of Philadelphia.

The winds at this time were chiefly from the south-east.

A few intermittents appeared in June, which yielded readily to the bark.

On the 16th day of June, Dr. Physick informed me he had a black boy under his care with the yellow fever.

In July, the hooping cough, cholera infantum, and some cases of dysentery and bilious fever appeared in the city.

On the 30th of July, Dr. Pascalis informed me that he had lost a patient on the fifth day of a yellow fever.

In August, the dysentery was the principal form of disease that prevailed in the city.

On the 22d of this month, a woman died of the yellow fever in Gaskill-street, under the care of Dr. Church.

On the 28th and 30th, there fell an unusual quantity of rain. The winds were south-west and north-west during the greatest part of the summer months. The latter were sometimes accompanied with rain.

On the 11th of September, a clerk of Mr. Levi Hollingsworth, and, on the 12th, a clerk of Mr. John Connelly, died with the yellow fever.

A plentiful shower of rain fell on the night of the 21st of this month.

About this time there appeared one and twenty cases of yellow fever in Spruce-street, between Front and Second-streets. They were all in the

neighbourhood of putrid exhalations. Fourteen of them ended fatally.

No one of the above cases of malignant fever could be traced to a ship, or to a direct or indirect intercourse with persons affected by that disease.

While Philadelphia was thus visited by a few sporadic cases only of yellow fever, it was epidemic in several of the cities of the United States, particularly in New-York, Providence, in Rhode Island, Norfolk, and Baltimore. In the last named place, it was publicly declared by the committee of health to be of domestic origin.

The dysentery was epidemic, at the same time, in several of the towns of Massachusetts and New-Hampshire. It was attended with uncommon mortality at Hanover, in the latter state.

This difference in the states of health and sickness in the different parts of the United States must be sought for chiefly in the different states of the weather in those places. The exemption of Philadelphia from the yellow fever, as an epidemic, may perhaps be ascribed to the strength and vigour of the vegetable products of the year, which retarded their putrefaction; to frequent showers of rain,

which washed away the filth of the streets and gutters; and to the perfection of the summer and autumnal fruits.

The months of November and December this year were uncommonly healthy. During the former, several light shocks of earthquakes were felt in Lancaster and Harrisburg, in Pennsylvania, and in Wilmington, in the state of Delaware.

AN

ACCOUNT OF SPORADIC CASES

OF

YELLOW FEVER,

AS THEY

APPEARED IN PHILADELPHIA,

IN 1801.

AN ACCOUNT, &c.

THE month of January was intensely cold. In February it became more moderate. The diseases, during these two months, were catarrhs and a few pleurisies.

In March and April there fell an unusual quantity of rain. The hay harvest began in the neighbourhood of Philadelphia on the 28th of May. A few mild cases of scarlatina anginosa occurred during these months.

In June the weather was dry and healthy.

On the 8th of July, a case of yellow fever occurred in the practice of Dr. Stewart. About the 15th of the month, a patient died with it in the Pennsylvania hospital. Dr. Physick informed me

that he had, at the same time, two patients under his care with that disease. Several cases of the measles appeared in the south end of the city during this month. In every part of it, the weather was warm and dry, in consequence of which there were no second crops of grass, and a smaller quantity than usual of summer fruits and vegetables. The winds were less steady than they had been for seven years. They blew, every two or three days, from nearly every point of the compass.

On the 4th of August there fell a considerable quantity of rain, which was succeeded by cool and pleasant weather. The cholera morbus was a frequent disease among both adults and children in the city, and the dysentery in several of the adjoining counties of the state.

A number of emigrant families arrived this month from Ireland and Wales, who brought with them the ship fever. They were carefully attended, at the lazaretto and the city hospital, in airy rooms, by which means they did not propagate the disease. Contrary to its usual character, it partook of the remissions of the bilious fever, probably from the influence of the season upon it.

In September there were a few extremely warm days. In the beginning and middle of the month a number of mild remittents occurred, and about the 22d there were five or six cases of yellow fever in Eighth-street, between Chesnut and Walnut-streets, in two houses ill ventilated, and exposed to a good deal of exhalation. I attended most of these cases in consultation with Dr. Gallaher. One of the persons who was affected with this fever puked black matter while I sat by his bed-side, a few hours before he died.

During the summer and autumn of this year, a number of cases of yellow fever appeared at New-Bedford, Portland, and Norwich, in the New-England states; in New-York; in some parts of New-Jersey; and in Northampton and Bucks counties, in Pennsylvania. It prevailed so generally in New-York, as to produce a considerable desertion of the city. In none of the above places could the least proof be adduced of the disease being imported. In Philadelphia its existence was doubted or denied by most of the citizens, because it appeared in situations remote from the water, and of course could not be derived from any foreign source.

It will be difficult to tell why the fever appeared only in sporadic cases in Philadelphia. Perhaps its

prevalence as an epidemic was prevented by the plentiful rains in the spring months, by the absence of moisture from the filth of the streets and gutters, in consequence of the dry weather in June and July, by the vigour and perfection of the products of the earth, and by the variable state of the winds in the month of July. If none of these causes defended the city from more numerous cases of the yellow fever, it must be resolved into the want of a concurring inflammatory constitution of the atmosphere with the common impure sources of that disease.

On the 12th of November, about twelve o'clock in the night, an earthquake was felt in Philadelphia, attended with a noise as if something heavy had fallen upon a floor. Several cases of scarlet fever appeared in December, but the prevailing disease, during the two last autumnal and the first winter months, was the measles. I have taken notice that it appeared in the south end of the city in July. During the months of August and September it was stationary, but in October, November, and December it spread through every part of the city. The following circumstances occurred in this epidemic, as far as it came under my notice.

AN ACCOUNT

OF

THE MEASLES,

AS THEY

APPEARED IN PHILADELPHIA,

IN THE YEAR 1801.

AN ACCOUNT, &c.

I. THE disease wore the livery of the autumnal fever in the following particulars.

It was strongly marked by remissions and intermissions. The exacerbations came on chiefly at night.

There were in many cases a constant nausea, and discharge of bile by puking.

I saw one case in which the disease appeared with a violent cholera morbus, and several in which it was accompanied with diarrhœa and dysentery.

II. Many severe cases of phrenzy, and two of cynanche trachealis appeared with the measles.

III. A distressing sore mouth followed them, in a child of two years old, that came under my care.

IV. A fatal hydrocephalus internus followed them in a boy of eight years old, whom I saw two days before he died.

V. I met with a few cases in which the fever and eruption came on in the same day, but I saw one case in which the eruption did not take place until the tenth, and another, in which it did not appear until the fourteenth day after the fever.

VI. Two children had pustules on their skins, resembling the small-pox, before the eruption of the measles.

VII. Many children had coughs and watery eyes, but without the measles. The same children had them two or three weeks afterwards.

VIII. Many people who had had the measles, had coughs during the prevalence of the measles, resembling the cough which occurs in that disease.

The remedies made use of in my practice were,

1. Bleeding, from four to sixty ounces, according to the age of the patient, and the state of the pulse. This remedy relieved the cough, eased the pains in the head, and in one case produced, when used a third time, an immediate eruption of the measles.

2. Lenient purges.

3. Demulcent drinks.

4. Opiates at night.

5. Blisters. And,

6. Astringent medicines, where a diarrhœa took place.

I saw evident advantages from advising a vegetable diet to many children, as soon as any one of the families to which they belonged were attacked by the measles.

I lost but one patient in this disease, and that was a child in convulsions. I ascribed my success to bleeding more generally and more copiously than I had been accustomed to do, in the measles of former years.

AN ACCOUNT

OF THE

BILIOUS YELLOW FEVER,

AS IT

APPEARED IN PHILADELPHIA,

IN THE YEAR 1802.

AN ACCOUNT, &c.

THE weather during the month of January was unusually moderate and pleasant. In the latter end of it, many shrubs put forth leaves and blossomed. I saw a leaf of the honeysuckle, which was more than an inch in length, and above half an inch in breadth. There was but one fall of snow, and that a light one, during the whole month.

The winds blew chiefly from the south-west in February. There was a light fall of snow on the 6th. A shad was caught in the Delaware, near the city, on the 17th. On the 18th and 19th of the month, the weather became suddenly very cold. On the 22d there was a snow storm, and on the 28th, rain and a general thaw.

In March, the weather was wet, cold, and stormy, with the exception of a few pleasant days.

The scarlatina anginosa and the cynanche trachealis were the principal diseases that prevailed during the three months that have been mentioned.

In April, there were several frosts, which destroyed the blossoms of the peach-trees.

In May, the weather was so cool as to make fires agreeable to the last day of the month. The wind blew chiefly, during the whole of it, from the north-east.

The scarlatina continued to be the reigning disease. I saw one fatal case of it, in which a redness only, without any ulcers or sloughs, appeared in the throat; and I attended another, in which a total immobility in the limbs was substituted by nature for the pain and swellings in those parts which generally attend the disease. There were three distinct grades of this epidemic. It was attended with such inflammatory or malignant symptoms, in some instances, as to require two or three bleedings; in others it appeared with a typhoid pulse, which yielded to emetics: turbith mineral was preferred for this

purpose; while a redness, without a fever, which yielded to a single purge, was the only symptom of it in many people.

The weather was cool, rainy, and hot, in sucession, in the month of June. The scarlatina continued to be the prevailing disease.

During the first and second weeks in July, there fell a good deal of rain. On the 4th of the month I was called to visit Mrs. Harris, in Front-street, between Arch and Market-streets, with a bilious fever. The scarlatina had imparted to it a general redness on her skin, which induced her to believe it was that disease, and to neglect sending for medical relief for several days. She died on the 13th of the month, with a red eye, a black tongue, hiccup, and a yellow skin. Three other cases of malignant bilious fever occurred this month. Two of them were attended by Dr. Dewees and Dr. Otto.

On the 15th of the month, the city was alarmed by an account of this fever having appeared near the corners of Front and Vine-streets, a part of the city which had for many weeks before been complained of by many people for emitting a fœtid smell, derived from a great quantity of filthy matters stag-

nating in that neighbourhood, and from the foul air discharged from a vessel called the Esperanza, which lay at Vine-street wharf.

On the 2d of August, it appeared in other parts of the city, particularly in Front and Water-streets, near the draw-bridge, where it evidently originated from putrid sources. Reports were circulated that it was derived from contagion, conveyed to Vine-street wharf in the timbers of a vessel called the St. Domingo Packet, but faithful and accurate inquiries proved that this vessel had been detained one and twenty days, and well cleaned at the lazaretto, and that no one, of fourteen men who had worked on board of her afterwards, had been affected with sickness of any kind.

On the 5th of August, the board of health publicly declared the fever to be contagious, and advised an immediate desertion of the city. The advice was followed with uncommon degrees of terror and precipitation.

The disease continued, in different parts of the city, during the whole of August and September. On the 5th of October, the citizens were publicly invited from the country by the board of health.

During this season, the yellow fever was epidemic in Baltimore and Wilmington. It the former place it was admitted by their board of health, and in the latter it was proved by Dr. Vaughan, to be of domestic origin. It prevailed, at the same time, in Sussex county and near Woodbury, in New-Jersey. Sporadic cases of it likewise occurred in New-York and Boston, and in Portsmouth, in New-Hampshire. The chronic fever was epidemic in several of the towns of North-Carolina; cases of fever, which terminated in a swelling and mortification of the legs, and in death on the third day, appeared on the waters of the Juniata, in Pennsylvania; and bilious fevers, of a highly inflammatory grade, were likewise common near Germantown and Frankford, in the neighbourhood of Philadelphia.

But few of the cases of yellow fever which have been mentioned came under my care, but I saw a considerable number of fevers of a less violent grade. They were the inflammatory, bilious, mild remitting, chronic, and intermitting fevers, and the febricula. They appeared, in some instances, distinct from each other, but they generally blended their symptoms in their different stages. The yellow fever often came on in the mild form of an intermittent, and even a febricula, and as often,

after a single paroxysm, ended in a mild remittent or chronic fever. When it appeared in the latter form, it was frequently attended with a slow or low pulse, and a vomiting and hiccup, such as attend in the yellow fever. This diversity of symptoms, with which the summer and autumnal fever came on, made it impossible to decide upon its type on the day of its attack. Having been deceived in one instance, I made it a practice afterwards to watch every case I was called to with double vigilance, lest it should contract a malignant form in my hands, without my being prepared to meet it. Of the five original and obvious cases of yellow fever to which I was called, I saved none, for I saw but one of them before the last stage of the disease. In many others, I have reason to believe I prevented that malignant form of fever, by the early and liberal use of depleting medicines. The practice of those physicians who attended most of the persons who had the yellow fever, was much less successful than in our former epidemics. I suspected at the time, and I was convinced afterwards, that it was occasioned by relying exclusively upon bleeding, purges, and mercury. The skin, in several of the cases which I saw, was covered with moisture. This clearly pointed out nature's attempt to relieve herself by sweating. Upon my mentioning this fact to the late Dr. Pfeiffer, jun.

he instantly adopted my opinion, and informed me, as a reason for doing so, that he had heard of several whole families in the Northern Liberties, where the disease prevailed most, who, by attacking it in its forming state by profuse sweats, had cured themselves, without the advice of a physician.

AN ACCOUNT

OF THE

BILIOUS YELLOW FEVER,

AS IT

APPEARED IN PHILADELPHIA,

IN 1803.

AN ACCOUNT, &c.

THE weather in January was uniformly cold. On the 21st of the month, the Delaware was completely frozen.

On the 4th of February there was a general thaw, attended with a storm of hail, thunder, and lightning, which lasted about three quarters of an hour. The diseases of both these winter months were catarrhs and bilious pleurisies. The latter appeared in a tertian type. The pain in the side was most sensible every other day.

The weather was cold and dry in March, in consequence of which, vegetation was unusually backward in April. The hooping cough, catarrhs, and scarlatina were the diseases of this month.

The beginning of May was very cool. There was ice on the 7th of the month. The winds, during the greatest parts of this and the previous month, were from the north-east.

In June, the weather was cool. Intermittents were common in this month, as well as in May. Such was the predominance of this type of fever over all other diseases, that it appeared in the form of profuse sweats, every other night, in a lady under the care of Dr. Dewees and myself, in the puerperile fever. On the intermediate nights she had a fever, without the least moisture on her skin. There were a few choleras this month. During the latter end of the month, I lost a patient with many of the symptoms of yellow fever.

The weather in July was alternately hot, moderate, and cool, with but little rain. The first two weeks of this month were healthy. A few tertian fevers occurred, which readily yielded to bark, without previous bleeding. Between the 25th and 31st of the month, three deaths took place from the yellow fever.

In the month of August, the weather was the same as in July, except that there fell more rain in it. Mild remittents and cholera infantum were now

common. There were likewise several cases of yellow fever during this month. One of them was in Fromberger's-court. It was induced by the fœtor of putrid fish in a cellar. A malignant dysentery was epidemic during this month in the upper part of Germantown, and in its neighbourhood. Several persons, Dr. Bensell informed me, died of it in thirty hours sickness. It prevailed, at the same time, in many parts of the New-England states.

In September, cases of yellow fever appeared in different parts of the city, but chiefly in Water, near Walnut-street. On the 12th of the month, the board of health published a declaration of its existence in the city, but said it was not contagious. This opinion gave great offence, for it was generally said to have been imported by means of a packet-boat from New-York, where the fever then prevailed, because a man had sickened and died in the neighbourhood of the wharf where this packet was moored. It was to no purpose to oppose to this belief, proofs that no sick person, and no goods supposed to be infected, had arrived in this boat, and that no one of three men, who had received the seeds of the disease in New-York, had communicated it to any one of the families in Philadelphia, in which they had sickened and died.

The disease assumed a new character this year, and was cured by a different force of medicine from that which was employed in some of the years in which it had prevailed in Philadelphia.

I shall briefly describe it in each of the systems, and then take notice of some peculiarities which attended it. Afterwards I shall mention the remedies which were effectual in curing it.

1. The pulse was moderately *tense* in most cases. It intermitted in one case, and in several others the tension was of a transient nature.

Hæmorrhages occured in many cases. They were chiefly from the nose, but in some instances they occurred from the stomach, bowels, and hæmorrhoidal vessels.

2. Great flatulency attended in the stomach, but sickness and vomiting were much less frequent than in former years. I saw but one case in which diarrhœa attended this fever.

3. I did not meet with a single instance of a glandular swelling in any part of the body.

4. There was a general disposition to sweat in this fever from its beginning. Two of my patients died, in whom no moisture could be excited on the skin. But I recovered one with a dry skin, by means of a purge, two bleedings, and blisters.

An efflorescence on the skin occurred in several instances. I saw black matter discharged from a blister in one case, and blood in another.

5. The stools were green and black. Bile was generally discharged in puking.

6. The blood exhibited the following appearances: siziness, lotura carnium, sunken crassamentum, red sediment, and what is called dense or unseparated blood. I saw no instance of its being dissolved.

7. The tongue was whitish and dark-coloured. This diseased appearance continued, in some instances, several days after a recovery took place. I saw no smooth, red, nor black tongue, and but one dry and one *natural* tongue. The latter was followed by death.

I did not see a single case in which the disease came on without an exciting cause; such as light

clothing and bed-clothes, sitting at doors after night, a long walk, gunning, and violent and unusual exercises of any kind. It was excited in a number of people by their exertions to extinguish a fire which took place in Water-street, between Market and Chesnut-streets, on the morning of the 25th of August. I saw a fatal instance of it succeed a severe tooth-ach. Whether this pain was the exciting cause, or the first morbid symptom of the fever, I know not; but I was led by it to bleed a young lady twice who complained of that pain, and who had at the same time a tense pulse. Her blood had the usual appearances which occur in the yellow fever.

The disease had different appearances in different parts of the city. It was most malignant in Water-street; but in many instances it became less so, as it travelled westward, so that about Ninth-street it appeared in the form of a common intermittent.

In every part of the city it often came on, as in the year 1802, in all the milder forms of autumnal fever formerly enumerated, and went off with the usual symptoms of yellow fever. Again, it came on with all the force and malignity of a yellow fever, and terminated, in a day or two, in a common

remittent or intermittent. These modes of attack were so common, that it was impossible to tell what the character, or probable issue of a fever would be, for two or three days.

The following remedies were found, very generally, to be effectual in this fever.

1. Moderate bleeding. I bled but three patients three, and only one, four times. In general, the loss of from ten to twenty ounces of blood, reduced the pulse from a synocha to a synoichoid or typhoid state, and thereby prepared the system for other remedies.

2. Purges were always useful. I gave calomel and jalap, castor oil, salts, and senna, according to the grade of the disease, and often according to the humour or taste of the patient. I aided these purges by glysters. In one case, where a griping and black stools attended, I directed injections of lime water and milk to be used, with the happiest effects.

3. I gave emetics in many cases with advantage, but never while the pulse was full or tense.

4. Having observed, as in the year 1802, a spontaneous moisture on the skin on the first day of the disease, in several cases, I was led to assist this disposition in nature to be relieved by the pores, by means of sweating remedies, but in no instance did I follow it, without previous evacuations from the blood-vessels or bowels; for, however useful the intimations of nature may be in acute diseases, her efforts should never be trusted to alone, inasmuch as they are in most cases too feeble to do service, or so violent as to do mischief. I saw one death, and I heard of another, from an exclusive reliance upon spontaneous sweats in the beginning of this fever. The remedies I employed to promote this evacuation by the pores were, an infusion of the eupatorium perfoliatum in boiling water, aided by copious warm drinks, and hot bricks and blankets, applied to the external surface of the body. The eupatorium sometimes sickened the stomach, and puked. The sweats were intermitted, and renewed two or three times in the course of four and twenty hours.

5. I derived great advantage from the application of blisters to the wrists, *before* the system descended to what I have elsewhere called, the blistering point. This was on the second and third days. My design, in applying them thus early, was to

attract morbid excitement to the extremities, and thereby to create a substitute for a salivation. They had this effect. The pain, increase of fever, and occasional strangury, which were produced by them, served like anchors to prevent the system being drifted and lost, by the concentration of morbid excitement in the stomach and brain, on the fourth, fifth, sixth, and seventh days of the disease. It gave me great pleasure to find, upon revising Dr. Home's account of the yellow fever, that this mode of applying blisters, in the early stage of the disease, was not a new one. He often applied them in the first stage of the fever, more especially when the yellow colour of the skin made its appearance on the first or second day. By the advice of Dr. Cheney, of Jamaica, he was led to prefer them to the thighs, instead of the trunk of the body, or the legs and arms. He forbids their ever being applied below the calf of the legs. This caution is probably more necessary in the West-Indies than in the United States. The pain and inflammation excited by the blisters were mitigated by soft poultices of bread and milk. The strangury soon yielded to demulcent drinks, particularly to flaxseed tea.

I was happy in not being compelled, by the violence or obstinacy of this fever, to resort to a sali-

vation in order to cure it, in a single instance; the discharges from the stomach and bowels, and from the veins, pores, and skin, having proved sufficient to convey the disease out of the system.

Two persons recovered this year who had the black vomiting. One of them was by means of large quantities of brandy and volatile alkali, administered by Dr. John Dorsey, in the city hospital; the other was by means of lime and water and milk, given by an intelligent nurse to one of my patients, during the interval of my visits to her.

From the history which has been given of the symptoms of this fever; from the less force of medicine that was necessary to subdue it; from the safety and advantage of blisters in its *early* stage; and from the small proportion which the deaths bore to the number of those who were affected, being seldom more than five in a hundred (including all the grades and forms of the disease), in the practice of most of the physicians, it is evident this fever was of a less malignant nature than it had been in most of the years in which it had been epidemic. There was one more circumstance which proved its diminution of violence, and that was, a more feeble operation of its remote cause. In the year 1802, nearly all the persons who were affected with the

fever in the neighbourhood of Vine and Water-streets, and in Water, between Walnut and Spruce-streets, died. This year, but two died of a great number who were sick in the former, and not one out of twelve who were sick in the latter place. The filth, in both parts of the city, was the same in both years. This difference in the violence and mortality of the fever was probably occasioned by a less concentrated state of the miasmata which produced it, or by the co-operation of a less inflammatory constitution of the atmosphere.

The yellow fever was epidemic, during the summer and autumn of this year, in New-York, and in Alexandria, in Virginia. In the latter place, Dr. Dick has informed the public, it was derived from domestic putrefaction.

AN

ACCOUNT OF SPORADIC CASES

OF

YELLOW FEVER,

AS THEY

APPEARED IN PHILADELPHIA,

IN 1804.

AN ACCOUNT, &c.

THE month of January was marked by deep snows, rain, clear and cold weather, and by the general healthiness of the city.

In February there fell a deep snow, which was followed by several very cold days. There was likewise a fall of snow in March, which was succeeded by an uncommon degree of cold. Catarrhs and bilious pleurisies were very common during both these months.

In the beginning of April, the weather was cold and rainy. There were but few signs of vegetation before the 15th of the month. Bilious pleurisies were still the principal diseases which prevailed in the city.

The month of May was wet, cool, and healthy.

In June, the winds were easterly, and the weather rainy. The crops of grass were luxuriant. It was remarked, that the milk of cows that fed upon this grass yielded less butter than usual, and that horses that fed upon it, sweated profusely with but little exercise. On the third of the month, I was called upon by Dr. Physick to visit his father, who was ill with a bilious fever. He died on the seventh, with a red eye, hiccup, and black vomiting.

Four persons had the yellow fever in the month of July. One of them was in Fourth-street, between Pine and Lombard-streets, another was in Fifth-street, between Race and Vine-streets, both of whom recovered. The remaining two were in the Pennsylvania hospital, both of whom died. Remitting and intermitting fevers were likewise common in this month.

In August, those fevers assumed a chronic form. During this month, there died an unusual number of children with the cholera morbus.

The city was uncommonly healthy in September. A storm of wind and rain, from the south-

east, proved destructive to the crops of cotton this month, on the sea coast of South-Carolina.

In October, intermittents were very common between Eighth-street and Schuylkill. One case of yellow fever came under my care, in conjunction with Dr. Gallaher, on the western banks of that river.

While Philadelphia and all the cities of the United States (Charleston excepted) were thus exempted from the yellow fever as an epidemic, the western parts of all the middle, and several of the southern states, were visited with the bilious fever, in all its different forms. In Delaware county, in the state of New-York, at Mill river, in Connecticut, and in several of the middle counties of Pennsylvania, it prevailed in the form of a yellow fever. In other parts of the United States, it appeared chiefly as a highly inflammatory remittent. It was so general, that not only whole families, but whole neighbourhoods were confined by it. Many suffered from the want of medical advice and nursing, and some from the want of even a single attendant. In consequence of the general prevalence of this fever in some parts of Pennsylvania, the usual labours of the season were suspended. Apples fell and perished upon the ground; no winter grain was

sowed; and even cows passed whole days and nights without being milked.

The mortality of this fever was considerable, where those distressing circumstances took place. In more favourable circumstances, it yielded to early depletion, and afterwards to the bark. Relapses were frequent, from premature exposure to the air. Those only escaped them who had been salivated, by accident or design, for the cure of the fever.

This disease was observed very generally to prevail most in high situations, which had been for years distinguished for their healthiness, while the low grounds, and the banks of creeks and rivers, were but little affected by it. The unusual quantity of rain, which had fallen during the summer months, had produced moisture in the former places, which favoured putrefaction and exhalation, while both were prevented, in the latter places, by the grounds being completely covered with water.

AN ACCOUNT

OF THE

BILIOUS YELLOW FEVER,

AS IT

APPEARED IN PHILADELPHIA,

IN THE YEAR 1805.

AN ACCOUNT, &c.

FOR a history of the uncommonly cold and tempestuous winter of 1804 and 1805, the reader is referred to the Account of the Climate of Pennsylvania, in the first volume of these Inquiries and Observations.

During the months of January, February, and March, there were a number of bilious catarrhs and pleurisies.

On the 7th of April, I visited a patient in the yellow fever with Dr. Stewart. He was cured, chiefly by copious bleeding.

The weather was rainy in May. After the middle of June, and during the whole month of July, there fell no rain. The mercury in Fahrenheit

fluctuated, for ten days, between 90° and 94°, during this month. The diseases which occurred in it were cholera infantum, dysenteries, a few common bilious, and eight cases of yellow fever. Three of the last were in Twelfth, between Locust and Walnut-streets, and were first visited, on the 14th and 15th of the month, by Dr. Hartshorn, as out-patients of the Pennsylvania hospital. Two of them were attended, about a week afterwards, by Dr. Church, in Southwark, and the remaining three by Dr. Rouisseau and Dr. Stewart, in the south end of the city.

On the third of August, there fell a heavy shower of rain, but the weather, during the remaining part of the month, was warm and dry. The pastures were burnt up, and there was a great deficiency of summer vegetables in the neighbourhood of Philadelphia. The water in the Schuylkill was lower by three inches than it had been in the memory of a man of 70 years of age, who had lived constantly within sight of it.

In September, a number of cases of yellow fever appeared in Southwark*, near Catharine-street.

* This extensive district is continued, from the city of Philadelphia, along the Delaware, but is not subject to its government.

They were readily traced to a large bed of oysters, which had putrified on Catharine-street wharf, and which had emitted a most offensive exhalation throughout the whole neighbourhood, for several weeks before the fever made its appearance. This exhalation proved fatal to a number of cats and dogs, and it now became obvious that the two cases of yellow fever, that were attended by Dr. Church, in the month of July, were derived from it. An attempt was made to impose a belief that they were taken by contagion from a ship at the lazaretto, which had lately arrived from the West-Indies, but a careful investigation of this tale proved, that neither of the two subjects of the fever had been on board that, nor any other ship, then under quarantine.

The fever prevailed during the whole of this month in Southwark. A few cases of it appeared in the city, most of which were in persons who had resided in, or visited that district. It was brought on by weak exciting causes in Southwark, but the cases which originated in the city, required strong exciting causes to produce them.

A heavy rain, accompanied with a good deal of wind, on the 28th of September, and a frost on the night of the 7th of October, gave a considerable check to the fever.

But few cases of it came under my care. Having perceived the same disposition in nature to relieve herself by the pores, that I observed in the years 1802 and 1803, my remedies were the same as in the latter year, and attended with the same success. Dr. Caldwell and Dr. Stewart, whose practice was extensive in Southwark, informed me, those remedies had been generally successful in their hands.

The only new medicine that the experience of this year suggested in this disease, was for one of its most distressing and dangerous symptoms, that is, the vomiting which occurs in its second stage. Dr. Physick discovered, that ten drops of the spirit of turpentine, given every two hours, in a little molasses, or syrup, or sweet oil, effectually checked it in several instances, in patients who afterwards recovered. It was administered with equal success in a case which came under my care, after an absence of pulse, and a coldness of the extremities had taken place. Dr. Church informed me that he gave great relief to the sick in the city hospital, by this medicine, by prescribing it in glysters, as well as by the mouth, in distressing affections of the stomach and bowels.

Dr. Stewart observed that all those persons who had been affected by the yellow fever in former years, had mild remittents in the same situations that others had the prevailing epidemic in a malignant form.

In one of four bodies the doctor examined, he found six, and in another three intussusceptions of the intestines, without any signs of inflammation. He discovered the common marks of disease from this fever in other parts of those bodies.

The deaths from this fever amounted to between three and four hundred. They would probably have been more numerous, had not those families who were in competent circumstances fled into the country, and had not the poor been removed, by the board of health, from the infected atmosphere of Southwark, to tents provided for them in the neighbourhood of the city; and they would probably have been fewer, considering the tractable nature of the disease, when met by suitable remedies in its early stage, had not the sick concealed their indisposition, in many instances, for two or three days, lest they should be dragged to the city hospital, or have centinels placed at their doors, to prevent any communication with their friends and neighbours. While these attempts were made to

check the progress of the fever, it did not escape the notice of many of the citizens of Philadelphia, that not a single instance occurred of its being communicated by contagion, in any of the families in the city, in which persons had sickened or died with it, and that while the sick were deprived of the kind offices of their friends and neighbours, lest they should be infected, physicians, and the members of the board of health, passed by the guards every day, in their visits to the same sick people, and afterwards mixed with their fellow-citizens, in every part of the city, without changing their clothes.

The yellow fever appeared early in the season in New-Haven, in Connecticut, and in Providence, on Rhode-Island, in both of which places it was derived from putrid exhalation, and was speedily and effectually checked by removing the healthy persons who lived in its neighbourhood to a distance from it. Several sporadic cases of it occurred during the autumn in Gloucester county, in New-Jersey, and in Mifflin and Chester counties, in Pennsylvania. It was epidemic in New-York at the same time it prevailed in Southwark and Philadelphia. The following extract of a letter from the health officer of New-York, to one of his

friends, contains a satisfactory proof that it was not, in that city, an imported disease.

Quarantine-ground, Sept. 7.

I most sincerely and tenderly deplore the unfortunate situation of our city. What do people say now of the origin of the disease? You may state, for the information of those who wished to be informed, that not a single vessel, on board of which a person has been sick with fever of any kind, or on board of which any person has died with any disease, while in the West-Indies, or on the voyage home, has ever gone up to the city during this whole season. This we know, and this we vouch for; and farther state, that all the cases of fever that have come down as from the city, have been *all* people of, and belonging to the city, and unconnected with the shipping, excepting one, a sailor, who had no connection with any foul vessel. There is not a shadow of proof or suspicion that can attach to the health-office, or to infected vessels, this season. I am, &c.

JOHN R. B. RODGERS.

Having concluded the history of the bilious yellow fever, as it has appeared in eleven successive years, since 1793, as an epidemic, or in sporadic

cases, I shall proceed next to enumerate all the sources of that fever, as well as all the other usual forms of the summer and autumnal disease of the United States, and afterwards mention the means of preventing them.

AN INQUIRY

INTO

THE VARIOUS SOURCES

OF THE USUAL FORMS OF

SUMMER & AUTUMNAL DISEASE

IN THE UNITED STATES,

AND THE MEANS OF PREVENTING THEM.

AN INQUIRY, &c.

THE business of the following inquiry is,

I. To enumerate the various sources of the usual forms of the summer and autumnal disease in the United States. And,

II. To mention the means of preventing them.

To render the application of those means as extensive as possible, it will be proper to mention, under the first head, all those sources of summer and autumnal disease, which have been known to produce it in other countries, as well as in the United States. They are,

1. Exhalations from marshes. These are supposed to be partly of a vegetable, and partly of an animal nature. They are derived from the shores of creeks and mill ponds, as well as from low and wet grounds; also from the following vegetable substances in a state of putrefaction.

2. Cabbage. A malignant fever was produced at Oxford, by a putrid heap of this vegetable some years ago, which proved fatal to many of the inhabitants, and to several of the students of the university at that place.

3. Potatoes. Nearly a whole ship's crew perished at Tortola, by removing from her hold, a quantity of putrid potatoes.

4. Pepper.

5. Indian meal.

6. Onions.

7. Mint.

8. Anise and caraway seeds, confined in the hold of a ship.

9. Coffee. "About the time," says Dr. Trotter, "when notice was taken of the putrefying coffee on the wharf at Philadelphia, in the year 1793, a captain of a man of war, just returned from the Jamaica station, informed me, that several vessels laden with the same produce came to Kingston, from St. Domingo. During the distracted state

of that colony, this article, with other productions, had been allowed to spoil and ferment. The evolution of a great quantity of fixed air, or carbonic acid gas, was the consequence; and in these vessels, when opening the hatchways, such was its concentrated state, that the whole of the crew, in some of them, were found dead on the deck. A pilot boarded one of them in this condition, and had nearly perished himself*."

10. Chocolate shells.

11. Cotton which had been wetted on board of a vessel that arrived in New-York, a few years ago, from Savannah, in Georgia.

12. Hemp, flax, and straw.

13. The canvas of an old tent.

14. Old books, and old paper money, that had been wetted, and confined in close rooms and closets.

15. The timber of an old house. A fever produced by this cause is mentioned by Dr. Haller, in his Bibliotheca Medicinæ.

* Medicina Nautica, p. 324.

16. Green wood confined in a close cellar during the summer months. A fever from this cause was once produced in this city, in a family that was attended by the late Dr. Cadwallader.

17. The green timber of a new ship. Captain Thomas Bell informed me, that in a voyage to the East-Indies, in the year 1784, he lost six of his men with the scurvy, which he supposed to be derived wholly from the foul air emitted by the green timber of his ship. The hammocks which were near the sides of the ship rotted during the voyage, while those which were suspended in the middle of the ship, retained their sound and natural state. This scurvy has been lately proved by Dr. Claiborne, in an ingenious inaugural dissertation, published in Philadelphia, in the year 1798, to be a misplaced state of malignant fever. Dr. Lind mentions likewise the timber of new ships as one of the sources of febrile diseases. The timber of soldiers' huts, and of the cabins of men who follow the business of making charcoal in the woods, often produce fevers, as soon as the bark begins to rot and fall from them, which is generally on the second year after they are erected. Fevers have been excited even by the exhalation from trees, that have been killed by being girdled in an old field.

18. The stagnating air of the hold of a ship.

19. Bilge water.

20. Water that had long been confined in hogsheads at sea.

21. Stagnating rain water.

22. The stagnating air of close cellars.

23. The matters which usually stagnate in the gutters, common sewers, docks, and alleys of cities, and in the sinks of kitchens. A citizen of Philadelphia, who had a sink in his kitchen, lost a number of cats and dogs by convulsions. At length one of his servants was affected with the same disease. This led him to investigate the cause of it. He soon traced it to his sink. By altering its construction, so as to prevent the escape of noxious air from it, he destroyed its unwholesome quality, so that all his domestics lived in good health in his kitchen afterwards.

24. Air emitted by agitating foul and stagnating water. Dr. Franklin was once infected with an intermitting fever from this cause.

25. A duck pond. The children of a family in this city were observed, for several successive years, to be affected with a bilious remitting fever. The physician of the family, Dr. Phineas Bond, observing no other persons to be affected with the same fever in the neighbourhood, suspected that it arose from some local cause. He examined the yard belonging to the house, where he found an offensive duck pond. The pond was filled with earth, and the family were afterwards free from an annual bilious fever.

26. A hog-stye has been known to produce violent bilious fevers throughout a whole neighbourhood in Philadelphia.

27. Weeds cut down, and exposed to heat and moisture near a house.

Fevers are less frequently produced by putrid animal, than by putrid vegetable matters. There are, however, instances of their having been generated by the following animal substances in a state of putrefaction.

1. Human bodies that have been left unburied upon a field of battle.

2. Salted beef and pork.

3. Locusts.

4. Raw hides confined in stores, and in the holds of ships.

5. A whale thrown upon the sea shore in Holland.

6. A large bed of oysters. The malignant fevers which prevailed in Alexandria, in Virginia, in 1803, and in Southwark, adjoining Philadelphia, in the year 1805, were derived from this cause*.

7. The entrails of fish. And,

8. Privies. The diarrhœa and dysentery are produced, oftener than any other form of summer and autumnal disease, by the fœtor of privies. During the revolutionary war, an American regi-

* It has been a common practice with many families, in New-York and Philadelphia, for several years past, to lay in a winter store of oysters in their cellars in the fall of the year. May not a part of these oysters, left in these cellars from forgetfulness, or from being unfit for use, become, by putrifying there, the cause of malignant fevers in the succeeding summer and autumn?

ment, consisting of 600 men, were affected with a dysentery, from being encamped near a large mass of human fæces. The disease was suddenly checked by removing their encampment to a distance from it. Five persons in one family were affected with the yellow fever in Philadelphia, in 1805, who lived in a house in which a privy in the cellar emitted a most offensive smell. No one of them had been exposed to the foul air of Southwark, in which the fever chiefly prevailed in the autumn of that year. Three of them sickened at the same time, which obviated the suspicion of the disease being produced by contagion.

There are several other sources of malignant fevers besides those which have been mentioned. They are, exhalations from volcanoes, wells, and springs of water; also flesh*, fish, and vegetables,

* The following fact, communicated to me by Mr. Samuel Lyman, a member of congress from the state of Massachusetts, shows the importance of attending to the condition of butchers' meat in our attempts to prevent malignant fevers.

A farmer in New-Hampshire, who had overheated a fat ox by excessive labour in the time of harvest, perceiving him to be indisposed, instantly killed him, and sent his flesh to a neighbouring market. Of twenty-four persons who ate of this flesh, fifteen died in a few days. The fatal disease

eaten in a putrid state; but these seldom act in any country, and two of them only, and that rarely, in the United States.

The usual forms of the disease produced by miasmata from the sources of them which have been enumerated are,

1. Malignant or bilious yellow fever.

2. Inflammatory bilious fever.

3. Mild remittent.

4. Mild intermittent.

5. Chronic, or what is called nervous fever.

6. Febricula.

7. Dysentery.

8. Colic.

9. Cholera morbus.

produced by this aliment fell, with its chief force, upon the stomach and bowels.

10. Diarrhœa.

In deriving all the above forms of disease from miasmata, I do not mean to insinuate, that sporadic cases of each of them are not produced by other causes.

In designating them by a single name, I commit no breach upon the ancient nomenclature of medicine. The gout affects not only the blood-vessels and bowels, but every other part of the body, and yet no writer has, upon that account, distinguished it by a plural epithet.

The four last of the forms of disease, that have been mentioned, have been very properly called intestinal states of fever. They nearly accord, in their greater or less degrees of violence and danger, with the first four states of fever which occupy the blood-vessels, and in the order in which both of them have been named. I shall illustrate this remark by barely mentioning the resemblance of the yellow fever to the dysentery, in being attended with costiveness in its first stage, from a suspended or defective secretion or excretion of bile, and in terminating very generally in death, when not met by the early use of depleting remedies.

The variety in the forms and grades of the summer and autumnal disease, in different seasons, and their occasional changes into each other in the same seasons, are to be sought for in the variety of the sensible and insensible qualities of the atmosphere, of the course of the winds, and of the aliments of different years.

II. The means of preventing the different forms of disease that have been mentioned, come next under our consideration.

Happily for mankind, Heaven has kindly sent certain premonitory signs of the most fatal of them. These signs appear,

I. Externally, in certain changes in previous diseases, in the atmosphere, and in the animal and vegetable creation.

II. In the human body.

1. The first external premonitory sign that I shall mention is, an unusual degree of violence in the diseases of the previous year or season. Many proofs of the truth of this remark are to be met with in the works of Dr. Sydenham. It has been confirmed in Philadelphia, in nearly all her malig-

nant fevers since the year 1793. It would seem as if great and mortal epidemics, like the planets, had satellites revolving round them, for they are not only preceded, but accompanied and followed, by diseases which appear to reflect back upon them some of their malignity. But there is an exception to this remark, for we now and then observe uncommon and general healthiness, before the appearance of a malignant epidemic. This was the case in Philadelphia, previously to the fevers of 1798 and 1799. I have ascribed this to the stimulus of the pestilential miasmata barely overcoming the action of weak diseases, without being powerful enough to excite a malignant fever.

2. Substances, painted with white lead, and exposed to the air, suddenly assuming a dark colour; and winds from unusual quarters, and unusual and long protracted calms, indicate the approach of a pestilential disease. The south winds have blown upon the city of Philadelphia, ever since 1793, more constantly than in former years. A smokiness or mist in the air, the late Dr. Matthew Wilson has remarked, generally precedes a sickly autumn in the state of Delaware.

3. Malignant and mortal epidemics are often preceded by uncommon sickness and mortality among

certain birds and beasts. They have both appeared, chiefly among wild pigeons and cats in the United States. The mortality among cats, previous to the appearance of epidemics, has been taken notice of in other countries. Dr. Willan says, it occurred in the city of London, between the 20th of March and the 20th of April, in the year 1797, before a sickly season, and Dr. Buneiva says it preceded a mortal epidemic in Paris. The cats, the doctor remarks, lose, on the second day of their disease, the power of emitting electrical sparks from their backs, and, when thrown from a height, do not, as in health, fall upon their feet*.

4. The common house fly has nearly disappeared from our cities, moschetoes have been multiplied, and several new insects have appeared, just before the prevalence of our late malignant epidemics.

5. Certain trees have emitted an unusual smell; the leaves of others have fallen prematurely; summer fruits have been less in size, and of an inferior quality; and apples and pears have been knotty, in the summers previous to several of our malignant

* Medical Journal, vol. iv.

autumnal fevers. Dr. Ambrose Parey says, an unusually rapid growth of mushrooms once preceded the plague in Paris.

II. The premonitory signs of an approaching malignant epidemic in the human body are,

1. A sudden drying up, or breaking out of an old sore; fresh eruptions in different parts of the body; a cessation of a chronic disease, or a conversion of a periodical into a continual disease. Of this there were many instances in Philadelphia, in the year 1793.

2. A peculiar sallowness of the complexion. This was observed to be general in Philadelphia, previous to the yellow fever of 1793. Dr. Dick informed me, that he had observed the same appearance in the faces of the people of Alexandria, accompanied in some cases with a yellowness of the eyes, during the summer of 1793, and previous to the appearance of a violent bilious fever on the banks of the Potowmac.

3. I have observed one or more of the following symptoms, namely, head-ach; a decay, or increase

of appetite; costiveness; a diminished or increased secretion of urine; a hot and offensive breath*; constant sweats, and sometimes of a fœtid nature, or a dry skin; wakefulness, or a disposition to early or protracted sleep; a preternaturally frequent pulse; unusual vivacity, or depression of spirits; fatigue and sweats from light exertions; hands, when rubbed, emitting a smell like hepar sulphuris; and, lastly, a sense of burning in the mouth; to be present in different persons, during the prevalence of our malignant epidemics.

* I have once known this breath, in a gentleman who had carried the seeds of the yellow fever in his body from Philadelphia into its neighbourhood, create sickness at the stomach in his wife; and I have heard of an instance in which a person, who left Philadelphia when highly impregnated with the miasmata of the same fever, creating sickness at the stomach in four or five persons who sat at the same table with him in the country. None of the above persons were afterwards affected by the fever. In an anonymous history of the plague in London, in the year 1664, in the possession of the author, it is said, the breath was a well-known signal of infection to persons who were not infected, and that whenever it was perceived, individuals and companies fled from it. The sickness in the above-mentioned persons was similar to that which is sometimes excited by the smell of a sore leg, or a gun-shot wound, upon the removal of its first dressing. It does not produce fever, because there is no predisposition to it.

The means of preventing the different forms of our summer and autumnal disease come next under our consideration. I shall first mention such as have been most effectual in guarding against its malignant form, and afterwards take notice of such as are proper in its milder grades. These means naturally divide themselves again,

I. Into such as are proper to protect individuals.

II. Such as are proper to defend whole communities from the disease. And,

III. Such as are proper to exterminate it, by removing its causes.

I. Of the means of protecting individuals.

Where flight is practicable, it should be resorted to in every case, to avoid an attack of a malignant fever. The heights of Germantown and Darby have, for many years, afforded a secure retreat to a large number of the citizens of Philadelphia, from their late annual epidemics. It were to be wished our governments possessed a power of compelling our citizens to desert the whole, or parts, of infected cities and villages. In this way the yellow fever was suddenly annihilated in Providence, on

Rhode-Island, and in New-Haven, in Connecticut, in the year 1805. But the same power should rigorously prevent the removal of the sick, except it be that class of them which have neither homes nor friends. The less the distance they are carried beyond the infected atmosphere, the better. The injury sustained by conveying them in a jolting carriage, for two or three miles, has often been proclaimed in the reports of our city hospitals, of patients being admitted without a pulse, and dying a few hours afterwards.

In leaving a place infected by miasmata, care should be taken not to expose the body to great cold, heat, or fatigue, for eighteen or twenty days, lest they should excite the dormant seeds of the disease into action.

But where flight is not enforced by law, or where it is not practicable, or preferred, safety should be sought for in such means as reduce the preternatural tone and fulness induced in the blood-vessels by the stimulus of the miasmata, and the suppression of customary secretions. These are,

1. A diet, accommodated to the greater or less exposure of the body to the action of miasmata, and to the greater or less degrees of labour, or ex-

ercise, which are taken. In cases of great exposure to an infected atmosphere, with but little exercise, the diet should be simple in its quality, and small in its quantity. Fresh meats and wine should be avoided. A little salted meat, and Cayenne pepper with vegetables, prevent an undue languor of the stomach, from the want of its usual cordial aliments. The less mortality of the yellow fever in the French and Spanish West-India islands than in the British, has been justly attributed to the more temperate habits of the natives of France and Spain. The Bramins, who live wholly upon vegetables, escape the malignant fevers of India, while whole regiments of Europeans, who eat animal food, die in their neighbourhood. The people of Minorca, Dr. Cleghorn says, who reside near gardens, and live chiefly upon fruit during the summer, escape the violent autumnal fever of that island. The field negroes of South-Carolina owe their exemption from bilious fevers to their living chiefly upon vegetables. There is a fact which shows, that not only temperance, but abstinence bordering upon famine, has afforded a protection from malignant fevers. In a letter which I received a few months ago, from the Rev. Thomas Hall, chaplain to the British factory at Leghorn, containing an account of the yellow fever which prevailed in that city, in the summer and autumn

of 1804, there is the following communication. "Of the *rich*, who live in large airy houses, there died but four persons with the fever. Of the *commodious*, who live comfortably, but not affluently, there died ten. Of the *poor*, who inhabited small and crowded rooms, in the dirty and confined parts of the city, there died nearly seven hundred. But of the *beggars*, who had scarcely any thing to eat, and who slept half naked every night upon hard pavements, not one died." From the reduced and exhausted state of the system in these people, they were incapable, if I may be allowed the expression, of the combustion of fever. Persons reduced by chronic diseases, in like manner, often escape such as are acute. Six French ships of the line landed 300 sick, at St. Domingo, while the yellow fever prevailed there in the year 1745, and yet no one of them was infected by it*.

Where the body is exposed to miasmata, and a great deal of exercise taken at the same time, broths, a little wine, or malt liquors, may be used with the fruits and garden vegetables of the season, with safety and advantage. The change from a full to a low diet should be made gradually. When made suddenly, it predisposes to an attack of the disease.

* Desportes, vol. i. p. 140.

2. Laxative medicines. Hundreds, perhaps thousands, of the citizens of Philadelphia were indebted for their preservation from the yellow fever to the occasional use of a calomel pill, a few grains of rhubarb, or a table-spoonful of sweet, or castor oil, during the prevalence of our late pestilential fevers. Even the air of Batavia has been deprived of its poisonous quality, by means of this class of medicines. A citizen of Philadelphia asked a captain of a New-England ship, whom he met at that island, how he preserved the whole crew of his ship in health, while half the sailors of all the other ships in the harbour were sick or dead. He informed him, that it was by giving each of them a gentle purge of sulphur every day.

3. A plentiful perspiration, or moderate sweats, kept up by means of warm clothing and bed-clothes. The excretion which takes place by the skin, is a discharge of the first necessity. I have never known an instance of a person's being attacked by the yellow fever in whom this discharge was constant, and equally diffused all over the body. Its effects are equally salutary in preventing the plague. So well known is this fact, that Mr. Volney informs us, in his Travels into Egypt, that the common salutation at Cairo, during the prevalence of the plague, is, "Do you sweat freely?" For the pur-

pose of promoting this excretion, flannel shirts or waistcoats worn next to the skin have been found more useful than linen. As the perspiration and sweats, which are thus discharged in a pestilential season, are often unusual in their quantity, and of a morbid quality, clean body-linen or flannel should be put on every day, and where this is not practicable, that which has been worn should be exchanged every morning and evening for that which has been exposed during the previous day and night, in a dry air.

4. Blood-letting. In addition to the authorities of Dr. Haller and Dr. Hodges, mentioned in another place*, in favour of this remedy, I shall subjoin a few others. Dr. Mitchell, in his Account of the Yellow Fever which prevailed in Virginia, in the year 1741, informs us, that it was often prevented in persons who were under the influence of its remote cause, by the loss of a few ounces of blood. It was formerly a practice among the physicians in St. Domingo, to bleed whole regiments of troops as soon as they arrived from France, by which means they were preserved from the malignant fever of the island.

* Account of the Yellow Fever in 1793, vol. iii.

During the short visit paid to this city, in the year 1798, by Dr. Borland, a respectable physician of the British army, he put into my hands the following communication. "In the beginning of August, "1797, 109 Dutch artillery arrived at Port au "Prince, in the Bangalore transport. The florid "appearance of the men, their cumbersome cloth- "ing, and the season of the year, seemed all unfa- "vourable omens of the melancholy fate we pre- "sumed awaited them. It was, however, thought "a favourable opportunity, by Dr. Jackson and "myself, to try what could be done in warding off "the fever. It was accordingly suggested to "Monsieur Conturier, the chief surgeon of the "foreign troops, and the surgeon of the regiment, "that the whole detachment should be blooded "freely, and that, the morning after, a dose of phy- "sic should be administered to every man. This "was implicitly complied with, a day or two after, "and at this moment in which I write, although "a period of four months has elapsed, but two of "that detachment have died, one of whom was in a "dangerous state when he landed. A success un- "paralleled during the war in St Domingo! It is "true, several have been attacked with the disease, "but in those the symptoms were less violent, and "readily subsided by the use of the lancet.

" The *crew* of the Bangalore, on her arrival at " Port au Prince, consisted of twenty-eight men. " With them no preventive plan was followed. In " a very few weeks eight died, and at present, of " the original number, but fourteen remain."

All these depleting remedies, whether used separately or together, induce such an artificial debility in the system, as disposes it to vibrate more readily under the impression of the miasmata. Thus the willow rises, after bowing before a blast of wind, while the unyielding oak falls to the ground by its side. It is from the similarity of the natural weakness in the systems of women, in the West-Indies, with that which has been induced by the artificial means that have been mentioned, that they so generally escape the malignant endemic of the islands.

A second class of preventives of malignant fever are such as obviate the internal action of miasmata, by exciting a general or partial determination to the external surface of the body. These are,

1. The warm bath. I have known this grateful remedy used with success in our city. It serves the treble purposes of keeping the skin clean, and the pores open, and of defending what are called

the vital organs from disease, by inviting its remote cause to the external surface of the body.

2. The cold bath, or cold water applied to the external surface of the body. Ulloa, in his travels through Cuba, tells us the Spaniards make it a practice, when partially wetted by the rain, to plunge themselves, with their wet clothes on, into the first stream of water they meet with afterwards, by which means they avoid taking the fever of the island. Where this cannot be conveniently done, the peasants strip off their clothes, and put them under a shelter, and receive showers of rain upon their naked bodies, and thus preserve themselves from the fever. Dr. Baynard has left it upon record, in his treatise upon the cold bath, that those persons who lived in water-mills, also watermen, bargemen, and fishermen, who were employed upon the river, and in dabbling in cold water, were rarely affected by the plague in London, in 1665, and that but two persons died with it on London bridge. The water carriers at Cairo, Mr. Volney says, uniformly escape the plague; and Dr. Chisholm informs us, that those negroes in Demarara who go naked, and are thereby disposed not to avoid showers of rain, are never affected with the fever of that country.

3. Washing the body, every morning and evening, with salt water. A whole ship's crew from Philadelphia was preserved by this means from the yellow fever, some years ago, in one of the West-India islands, while a large proportion of the crews of several ships, that lay in the same harbour, perished by that disease.

4. Anointing the body with oil. The natives of Africa, and some American Indians, use this preventive with success during their sickly seasons. It has lately been used, it is said, with effect in preventing the plague. Its efficacy for that purpose was first suggested by no oilman having died of that disease during four years, in which time 100,000 people perished with it in Egypt. Oliver, in his Travels into that country, says the men who make and sell butter, are equally fortunate in escaping it.

5. Issues, setons, and blisters belong to this class of preventives of malignant and bilious fevers. Issues, according to Parisinus, Florentinus, Forestus, and several other authors quoted by Diemerbroeck, have prevented the plague in many hundred instances. Paræus says, all who had ulcers from the venereal disease, or any other cause, escaped it. Dr. Hodges owed his preservation from the plague

in London, in 1665, to an issue in his leg. He says he always felt a slight pain in it when he went into a sick room. Dr. Gallaher ascribed his escape from the yellow fever of 1799 to a perpetual blister, which he applied to his arm for that purpose. Dr. Barton favoured me with the sight of a letter from Dr. James Stevens, dated January 12, 1801, in which he says he believed Dr. Beach (formerly of Connecticut) had been preserved from the bilious fever by a seton in his side. He adds further, that Dr. Beach had been called to attend the labourers at the Onandoga salt springs, in the state of New-York, ninety-eight of whom out of a hundred had the bilious fever. Of the two who escaped it, one had a sore leg, the other what is called a scald-head. The discharge from the sores in each of them, as well as from the doctor's issue, was more copious during the prevalence of the fever, than it had been at any other time.

A third class of preventives of malignant fever, are such as excite a general action, more powerful than that which the miasmata are disposed to create in the system, or an action of a contrary nature. These are,

1. Onions and garlic. All those citizens who used these vegetables in their diet, escaped the yel-

low fever in 1793. The greater exemption of the natives of France from this disease, wherever they are exposed to it, than of the inhabitants of other European countries, has been ascribed in part to the liberal use of those condiments in their food. The Jews, it has been said, have often owed to them their preservation from the plagues which formerly prevailed in Europe. It is probable leeks and onions, which to this day form a material part of the diet of the inhabitants of Egypt, were cultivated and eaten originally as the means of obviating the plagues of that country. I have been at a loss to know why the Author of Nature, who has endowed these vegetables with so many excellent qualities for diet and medicine, should have accompanied them with such a disagreeable smell. Perhaps the reason was, kindly to force them into universal use; for it is remarkable their smell in the breath is imperceptible to those who use them.

2. Calomel, taken in such small doses as gently to affect the gums. It preserved most of the crew of a Russian ship at Plymouth, in the year 1777, from a fever generated by filth in her hold. In a letter which I received from Captain Thomas Truxton, in the year 1797, he informed me, that an old and respectable merchant at Batavia had assured him, he had been preserved in good health

by calomel, taken in the way that has been mentioned, during the sickly seasons, for upwards of thirty years. The mortality of the fevers of that island may easily be conceived of, when I add, on the authority of a physician quoted in Sir George Staunton's Account of his Embassy to China, that one half of all new comers die there on the first year of their arrival.

Our principal dependence should be placed upon those two preventives under this head. There are several others which have been in common use, some of which I believe are hurtful, and the rest are of feeble, or doubtful efficacy. They are,

3. Wine and ardent spirits. They both prevent a malignant fever, only when they excite an action in the system above that which is ordinarily excited by the miasmata of the fever; but this cannot be done without producing intoxication, which, to be effectual, must be perpetual; for the weakness and excitability, which take place in the intervals of drunkenness, predispose to the disease. Agreeably to this remark, I observed three persons, who were constantly drunk, survive two of our most fatal epidemics, while all those persons who were alternately drunk and sober, rarely escaped an at-

tack of the fever. In most of them, it terminated in death.

4. Tobacco. Many hundreds of the citizens of Philadelphia can witness, that no benefit was derived from this weed, in any of the ways in which it is commonly used, in the late epidemics of our city. Mr. Howard says it has no effect in preserving from the plague.

5. Camphor suspended in a bag round the neck, and rags wetted in vinegar, and applied to the nose. These means were in general use in the fever of 1793, in Philadelphia, but they afforded no protection from it. It is possible they had a contrary effect, by entangling, in their volatile particles, more of the miasmata of the fever, and thus increasing a predisposition to it.

A fourth class of the preventives of malignant fevers are certain substances which are said to destroy miasmata by entering into mixture with them. Two persons, who were very much exposed to the causes of the fever in 1798, took each of them a table spoonful of sweet oil every morning. They both escaped the fever. Did the oil, in these cases, act by destroying miasmata in the stomach chemically? or did it defend the stomach mecha-

nically from their action? or did it prevent the disease, only by gently opening the bowels? It is certain the fat of pork meat protects the men who work in the lead-mines of Great-Britain from the deleterious effects which the fumes of that metal are apt to bring upon the stomach and bowels, and that a poisoned arrow, discharged into the side of a hog, will not injure him, if it be arrested by the fat which lines that part of his body.

The vapour which issues from fresh earth has been supposed to destroy the miasmata which produce malignant fevers, by entering into mixture with them. Most of the men who were employed in digging graves and cellars, and in removing the dirt from the streets of Philadelphia, in 1793, escaped the fever of that year. In the new settlements of our country, it is said, the poison of the rattlesnake is deprived of its deadly effects upon the body, by thrusting the wounded limb into a hole, recently made in the earth. The fable of Anteus, who rose with renewed strength from the ground after repeated falls, was probably intended to signify, among other things, the salutary virtues which are contained in the effluvia which issue from fresh clods of earth.

3. There are many facts which show the efficacy of the volatile alkali in destroying, by mixture, the poison of snakes. One of them was lately communicated to the public by Dr. Ramsay, of South-Carolina. What would be the effect of the daily use of a few tea-spoonfuls of this medicine in a liquid form, and of frequently washing the body with it, during the prevalence of pestilential epidemics?

The miasmata which produce malignant fevers often exist in an inoffensive state in the body, for weeks, and perhaps months, without doing any harm. With but a few exceptions, they seldom induce a disease without the reinforcement of an exciting cause. In vain, therefore, shall we use all the preventives that have been recommended, without,

V. Avoiding of all its exciting causes. These are,

1. Heat and cold. While the former has excited the yellow fever in thousands, the latter has excited it in tens of thousands. It is not in middle latitudes only that cold awakens this disease in the body. Dr. Mosely says it is a more frequent exciting cause of that, and of other diseases, in the

island of Jamaica, than in any of the most temperate climates of the globe. It is this which renders cases of yellow fever, when epidemic in our cities, more numerous in the cool months of September and October, than in July and August. For the purpose of avoiding this pernicious and universal influence of cold, the clothing and bed-covers should be rather warmer in those months, in middle and northern latitudes, than is agreeable, and fires should be made every morning and evening in common sitting rooms, and during the whole day, when the weather is damp or cool. They serve, not only to prevent the reduction of the excitement of the blood-vessels, by the gradual and imperceptible abstraction of the heat of the body, but to convey up a chimney all the unwholesome air that accumulates in those rooms during a sickly season. By these precautions, I have known whole families preserved in health, while all their neighbours who neglected them, have been confined by a prevailing autumnal fever.

3. The early morning and evening air, even in warm weather.

4. Fatigue from amusements, such as fishing, gunning, and dancing, and from *unusual* labour or exercise. The effects of fatigue from this cause

have been already noticed*, in the maids of large families being the only persons who die of the fever, in consequence of their having performed great and *unusual* services to those branches of the family who survive them, while nurses, who only exercise their ordinary habits in attending sick people, are seldom carried off by it.

5. Intemperance in eating and drinking.

6. Partaking of *new* aliments and drinks. The stomach, during the prevalence of malignant fevers, is always in an irritable state, and constantly disposed to be affected by impressions that are not habitual to it.

7. Violent emotions or passions of the mind.

8. The entire cessation of moderate labour. This, by permitting the mind to ramble upon subjects of terror and distress, and by exposing the body to idleness and company, favours an attack of fever. A predisposition to it, is likewise created by alternating labour and idleness with each other.

9. The continuance of hard labour. The miasmata which produce malignant fevers some-

* Account of the Yellow Fever in 1793, vol. iii.

times possess so much force, that the least addition to it, even from customary acts of labour, is sufficient to excite the disease. In this case, safety should be sought in retirement, more especially by those persons whose occupations expose them to the heat of fires, and the rays of the sun, such as hatters, smiths, bricklayers, and house and ship carpenters. The wealthy inhabitants of Constantinople and Smyrna erroneously suppose they escape the contagion of the plague, by shutting themselves up in their houses during its prevalence. They owe their preservation chiefly to their being removed, by an exemption from care and business, from all its exciting causes. Most of the nobility and gentry of Moscow, by these means escaped a plague which carried off 27,000 persons in that city, in the year 1771, and many whole families in Philadelphia were indebted for their safety to the same precautions in the year 1793. Confinement is more certain in its beneficial effects, when persons occupy the upper stories only of their houses. The inhabitants of St. Lucia, Dr. Chisholm says, by this means often escape the yellow fever of that island. Such is the difference between the healthiness of the upper and lower stories of a house, that, travellers tell us, birds live in the former, and die in the latter, during the prevalence of a plague in the eastern countries.

All the exciting causes that have been enumerated should be avoided with double care three days before, and three days after, as well as on the days of the full and change of the moon. The reason for this caution was given in the account of the yellow fever in Philadelphia in the year 1797.

To persons who have retired from infected cities, or countries, it will be necessary to suggest a caution, not to visit them while the malignant fever from which they fled prevails in them. Dr. Dow informed me, in his visit to Philadelphia in the year 1800, that the natives and old citizens of New-Orleans who retired into the country, and returned during the prevalence of the yellow fever in that city, the year before, were often affected by it, while all such persons as did not change their residence, escaped it. The danger from visiting an infected city is greater to persons who breathe an atmosphere of a uniform temperature, than one that is subject to alternate changes in its degrees of heat and cold. The inhabitants of Mexico, Baron Humboldt informed me, who descend from their elevated situation, where the thermometer seldom varies more than ten degrees in the year, and visit Vera Cruz during the prevalence of the yellow fever in that city, are much oftener affected by it than the new comers from the variable climates of

European countries. But the habits of insensibility to the impressions of the miasmata of this disease in one country, do not always protect the system from their action in another. The same illustrious traveller informed me, that the inhabitants of the Havannah who visit Vera Cruz, and the inhabitants of Vera Cruz who visit the Havannah, are affected in common with strangers with the fever of those places.

I shall take leave of this part of our subject, by adding, that I am so much impressed with a belief in the general, and almost necessary connection of an exciting cause with a yellow fever, that were I to enter a city, and meet its inhabitants under the first impressions of terror and distress from its appearance, my advice to them should be, "BEWARE, not of contagion, for the yellow fever of our country is not contagious, nor of putrid exhalations, when the duties of humanity or consanguinity require your attendance, but BEWARE OF EXCITING CAUSES!"

In the mild grades of the summer and autumnal fevers of the United States, the means of prevention should be different from those which have been recommended to prevent the yellow fever. They consist of such things as gently invigorate

the system, and thus create an action superior to that which the miasmata have excited in it. The means commonly employed for this purpose are,

1. Cordial diet and drinks; consisting of salted meat, and fish, with a moderate quantity of wine and malt liquors. Dr. Blane says, the British soldiers who lived upon salt meat, during the American war, were much less afflicted with the intermitting fever than the neighbouring country people; and, it is well known, the American army was much less afflicted with summer and autumnal fevers, after they exchanged their fresh meat for rations of salted beef and pork. Ardent spirits should be used cautiously, for, when taken long enough to do good, they create a dangerous attachment to them. A strong infusion of any bitter herb in water, taken upon an empty stomach, is a cheap substitute for all the above liquors where they cannot be afforded. The Peruvian bark has in many instances been used with success as a preventive of the mild grades of the summer and autumnal fevers of our country.

2. An equable and constant perspiration. This should be kept up by all the means formerly mentioned for that purpose.

3. Avoiding certain exciting causes, particularly great heat and cold, fatigue, long intervals between meals, intemperance, and the morning and evening air, more especially during the lunar periods formerly mentioned. Dr. Lind says, the farmers of Holdernesse, in England, who go out early to their work, are seldom long lived, probably from their constitutions being destroyed by frequent attacks of intermitting fevers, to which that practice exposes them. Where peculiar circumstances of business render it necessary for persons to inhale the morning air, care should be taken never to do it without first eating a cordial breakfast.

The *intestinal* state of our summer and autumnal disease requires several specific means to prevent it, different from those which have been advised to defend the blood-vessels from fever. Unripe and decayed fruit should be avoided, and that which is ripe and sound should not be eaten in an excessive quantity. Spices, and particularly Cayenne pepper, and the red pepper of our country, should be taken daily with food. Mr. Dewar, a British surgeon, tells us, the French soldiers, while in Egypt, carried pepper in boxes with them, wherever they went, to eat with the fruits of the country, and thereby often escaped its diseases. The whole diet, during the prevalence of intestinal diseases,

when they are not highly inflammatory, should be of a cordial nature. A dysentery prevailed, a few years ago, upon the Potomac, in a part of the country which was inhabited by a number of protestant and catholic families. The disease was observed to exist only in the former. The latter, who ate of salted fish every Friday, and occasionally on other days of the week, very generally escaped it. In the year 1759, a dysentery broke out in the village of Princeton, in New-Jersey, and affected many of the students of the college. It was remarked, that it passed by all those boys who came from the cities of New-York and Philadelphia. This was ascribed to their having lived more upon tea and coffee than the farmers's sons in the college; for those cordial articles of diet were but rarely used, six and forty years ago, in the farm houses of the middle states of America. I mentioned formerly that the cordial diet of the inhabitants of our cities was probably the reason why the dysentery so seldom prevailed as an epidemic in them.

Another means of preventing the dysentery is, by avoiding costiveness, and by occasionally taking purging physic, even when the bowels are in their natural state. A militia captain, in the Pennsylvania service, preserved his whole company from a dysentery which prevailed in a part of the Ame-

rican army at Amboy, in the year 1776, by giving each of them a purge of sea-water. He preserved his family, and many of his neighbours, some years afterwards, from the same disease, by dividing among them a few pounds of purging salts. It was prevented, a few years ago, in the academy of Bordentown, in New-Jersey, by giving all the boys molasses, in large quantities, in their diet and drinks. The molasses probably acted only by keeping the bowels in a laxative state.

As the dysentery is often excited by the dampness of the night air, great care should be taken to avoid it, and, when necessarily exposed to it, to defend the bowels by more warmth than other parts of the body. The Egyptians, Mr. Dewar says, tie a belt about their bowels for that purpose, and with the happiest effects.

II. I come now, according to the order I proposed, to mention the means of preserving whole cities or communities from the influence of those morbid exhalations which produce the different forms of summer and autumnal disease, and, in particular, that which is of a malignant nature.

As the flight of a whole city is rarely practicable, it will be necessary to point out the means of destroying the morbid miasmata.

1. Where the putrid matters which emit them are of a small extent, they should be covered with water or earth. Purchas tells us, 500 persons less died of the plague the day after the Nile overflowed the grounds which had emitted the putrid exhalations that produced it, than had died the day before. During the prevalence of a malignant fever, it will be unsafe to remove putrid matters. A plague was generated by an attempt to remove the filth which had accumulated on the banks of the waters which surround the city of Mantua, during the summer and autumnal months*. Even a shower of rain, by disturbing the green pellicle which is sometimes formed over putrid matters, I shall mention in another place, has let loose exhalations that have produced a pestilential disease.

2. Impregnating the air with certain effluvia, which act either by destroying miasmata by means of mixture, or by exciting a new action in the system, has, in some instances, checked the progress of a malignant fever. The air extricated from fer-

* Burserus.

menting wines, during a plentiful vintage, Vansweiten tells us, has once checked the ravages of a plague in Germany. Ambrose Parey informs us, the plague was checked in a city in Italy by killing all the cats and dogs in the place, and leaving them to putrify in the streets. Mr. Bruce relates, that all those persons who lived in smoky houses, in one of the countries which he visited, escaped bilious fevers, and Dr. Clark mentions an instance, in which several cooks, who were constantly exposed to smoke, escaped a fever which affected the whole crew of a galley. The yellow fever has never appeared within the limits of the effluvia of the sal ammoniac manufactory, nor of the tan-pits in the suburbs of Philadelphia, nor has the city of London been visited with a plague since its inhabitants have used sea-coal for fuel. But other causes have contributed more certainly to the exemption of that city from the plague for upwards of a century, one of which shall be mentioned under our next head.

3. Desquenette tells us, the infection of the plague never crosses the Nile, and that it is arrested by means of ditches, dug and filled with water for that purpose. Dr. Whitman has remarked, that the plague never passes from Abydos, on the Turkish, to Mito, on the European side of the wa-

ter of the Dardanelles, which forms the entrance to Constantinople. The yellow fever has never been known to pass from Philadelphia to the Jersey shore, and the miasmata generated on the east side of the Schuylkill rarely infect the inhabitants of the opposite side of the river. Many persons found safety from the plague of London, in 1665, by flying to ships which lay in the middle of the Thames, and, it is well known, no instance of yellow fever occurred in those Philadelphia families that confined themselves to ships in the middle of the Delaware, in the year 1793. But three or four, of four hundred men, on board a ship of war called the Jason, commanded by captain Coteneuil, perished with an epidemic yellow fever, in the year 1746, at St. Domingo, in consequence, Dr. Desportes says, of her hold being constantly half filled with water*. I have multiplied facts upon this subject, because they lead to important conclusions. They show the immense consequence of frequently washing the streets and houses of cities, both to prevent and check pestilential fevers. What would be the effect of placing tubs of fresh water in the rooms of patients infected with malignant fevers, and in an atmosphere charged with putrid exhalations?

* Vol. I. p. 161.

Their efficacy in absorbing the matter which constitutes the odour of fresh paint, favours a hope that they would be useful for that purpose. I have mentioned an instance, in the Account of the Yellow Fever in Philadelphia, in the year 1797, in which they were supposed to have been employed with evident advantage.

4. Intercepting the passage of miasmata to the inhabitants of cities. Varro, in his Treatise upon Agriculture, relates, that his namesake Varro, a Roman general, was in great danger of suffering, with a large fleet and army, from a malignant fever at Conyra. Having discovered the course of the miasmata which produced it to be from the south, he fastened up all the southern windows and doors of the houses in which his troops were quartered, and opened new ones to the north, by which means he preserved them from the fever which prevailed in all the other houses of the town and neighbourhood. Mr. Howard advises keeping the doors and windows, of houses which are exposed to the plague, constantly shut, except during the time of sunshine.

Several other means have been recommended to preserve cities from malignant fevers during their

prevalence, which are of doubtful efficacy, or evidently hurtful. They are,

5. Strewing lime over putrid matters. Dr. Dalzelle says, he once checked a bilious fever, by spreading twelve barrels of lime on a piece of marshy ground, from whence the exhalations that produced it were derived*. A mixture of quick lime and ashes in water, when thrown into a privy, discharges from it a large quantity of offensive air, and leaves it afterwards without a smell. As this foul air is discharged into the atmosphere, it has been doubted whether the lime and ashes should be used for that purpose, after a malignant fever has made its appearance.

6. Mr. Quiton Morveau has lately proposed the muriatic gas as a means of destroying miasmata. However effectual it may be in destroying the volatile and foul excretions which are discharged from the human body in confined situations, as in filthy jails, hospitals, and ships, it is not calculated to oppose the seeds of a disease which exist in the atmosphere, and which are diffused over a large extent of city or country. Mr. Morveau ascribes great virtues to it, in checking the malignant fever

* Sur les Maladies des Climats Chauds.

in Cadiz, in 1801, but from the time at which it was used, being late in the autumn, there is more reason to believe it had run its ordinary course, or that it was destroyed by cold weather.

7. The explosion of gunpowder has been recommended for checking pestilential diseases. Mr. Quiton Morveau says, it destroys the offensive odour of putrid exhalations, but does not act upon the fevers produced by them.

8. Washing the floors of houses with a solution of alkaline salts in water, has been recommended by Dr. Mitchell, as an antidote to malignant fevers. As yet, I believe, there are no facts which establish the efficacy of the practice, when they are produced by exhalations from decayed vegetable and animal substances in a putrid state.

9. Large fires have sometimes been made in cities, in order to destroy the miasmata of pestilential diseases. They were obviously hurtful in the plague of London, in the year 1665. Dr. Hodges, who relates this fact, says, "Heaven wept for the mistake of kindling them, and mercifully put them out, with showers of rain."

I cannot conclude this head, without lamenting the want of laws in all our states, to compel physicians to make public the first cases of malignant fever that come under their notice. The cry of fire is not more useful to save a city from destruction, than the early knowledge of such cases would be to save it from the ravages of pestilential and mortal epidemics. Hundreds of instances have occurred, in all ages and countries, in which they might have been stifled in their birth, by the means that have been mentioned, had this practice been adopted. But when, and where, will science, humanity, and government first combine to accomplish this salutary purpose? Most of our histories of mortal epidemics abound with facts which show a contrary disposition and conduct in physicians, rulers, and the people. I shall mention one of these facts only, to show how far we must travel over mountains of prejudice and error, before we shall witness that desirable event. It is extracted from the second volume of the Life of the late Empress of Russia. "The Russian army (says the biographer), after defeating the Turks, on entering their territories were met by the plague, and brought it to their country, where the folly of several of their generals contributed to its propagation, as if they thought by a military word of command to alter the nature of things. Lieutenant-

general Stoffeln, at Yassy, where the pestilence raged in the winter of 1770, issued peremptory orders that its name should not be pronounced; he even obliged the physicians and surgeons to draw up a declaration in writing, that it was only *a spotted fever*. One honest surgeon of the name of Kluge refused to sign it. In this manner the season of prevention was neglected. Several thousand Russian soldiers were by this means carried off. The men fell dead upon the road in heaps. The number of burghers that died was never known, as they had run into the country, and into the forests. At length the havoc of death reached the general's own people: he remained true to his persuasion, left the town, and went into the more perilous camp. But his intrepidity availed him nothing; he died of the plague in July, 1771*."

III. Let us now consider, in the last place, the means of exterminating malignant and other forms of summer and autumnal disease, by removing their causes. These means are,

1. The removal or destruction of all those putrid matters formerly enumerated, which are capa-

* The above disease appears to have been the camp fever, the origin and character of which will be noticed in the next article.

ble of producing fevers. Many of the institutions of the Jewish nation, for this purpose, are worthy of our imitation. The following verses contain a fund of useful knowledge upon this subject.—"Thou shalt have a place without the camp, whether thou shalt go forth abroad; and shalt have a paddle upon thy weapon, and it shall be when thou wilt ease thyself abroad, thou shalt dig therewith, and shalt turn back, and cover that which cometh from thee; for the Lord thy God walketh in the midst of thy camp to deliver thee, therefore shall he *see no unclean thing in thee*, and turn away from thee." Deuteronomy, chapter xxiii. verses 12, 13, and 14. "But the flesh of the bullock, and his skin, and his dung, shalt thou *burn with fire without the camp.*" Exodus, chapter xxxix. verse 14. The advantages of thus burying and removing all putrid matters, and of burning such as were disposed to a speedy putrefaction, in a crowded camp, and in a warm climate, are very obvious. Their benefits have often been realized in other countries. The United Provinces of Holland hold their exemption from the plague, only by the tenure of their cleanliness. In the character given by Luther of Pope Julius, he says, "he kept the streets of Rome so clean and sweet, that there were no plagues nor sicknesses during his time." The city of Oxford was prepared to afford

an asylum to the royal family of Great-Britain from the plague, when it ravaged London, and other parts of England, in the year 1665, only in consequence of its having been cleaned, some years before, by the Bishop of Winchester. In a manuscript account of the life of Doctor, afterwards Governor Colden, of New-York, there is the following fact. It was first communicated to the public in the daily gazette of the capital of that state, on the 30th of October, 1799. "A malignant fever having raged with exceeding violence for two summers successively in the city of New-York, about forty years ago, he communicated his thoughts to the public, on the most probable cure of the calamity. He published a little treatise on the occasion, in which he collected the sentiments of the best authority, on the bad effects of *stagnating waters*, *moist air*, *damp cellars*, *filthy shores*, and *dirty streets*. He showed how much these nuisances prevailed in many parts of the city, and pointed out the remedies. The corporation of the city voted him their thanks, adopted his reasoning, and established a plan for draining and cleaning the city, which was attended with the most happy effects." The advantages of burning offal matters, capable by putrefaction of producing fevers, has been demonstrated by those housekeepers, who, instead of collecting the entrails of fish and poultry,

and the parings and skins of vegetables, in barrels, instantly throw them into their kitchen fires. The families of such persons are generally healthy.

2. In the construction of cities, narrow streets and alleys should be carefully avoided. Deep lots should be reserved for yards and gardens for all the houses, and subterraneous passages should be dug to convey, when practicable, to running water, the contents of privies, and the foul water of kitchens. In cities that are wholly supplied with fresh water by pipes from neighbouring springs or rivers, all the evils from privies might be prevented by digging them so deep as to connect them with water. Great advantages, it has been suggested, would arise in the construction of cities, from leaving open squares, equal in number and size to those which are covered with houses. The light and dark squares of a chequer-board might serve as models for the execution of such a plan. The city of London, which had been afflicted nearly every year for above half a century by the plague, has never been visited by it since the year 1666. In that memorable year, while the inhabitants were venting their execrations upon a harmless bale of silks imported from Holland, as the vehicle of the seeds of their late mortal epidemic, Heaven kindly pointed out, and removed its cause, by permitting a fire to

destroy whole streets and lanes of small wooden buildings, which had been the reservoirs of filth for centuries, and thereby the sources of all the plagues of that city*. Those streets and lanes were to London, what Water-street and Farmer's-row are to Philadelphia, Fell's-point to Baltimore, the slips and docks to New-York, and Water-street to the town of Norfolk.

3. Where the different forms of summer and autumnal disease arise from marsh exhalations, they should be destroyed by drains, by wells communicating with their subterraneous springs, or by cultivating upon them certain grasses, which form a kind of mat over the soil, and, when none of these modes of destroying them is practicable, by overflowing them with water.

I have met with many excellent quotations from a work upon this part of our subject, by Tozzetti, an Italian physician, from which, I have no doubt, much useful information might be obtained. The Rev. Thomas Hall, to whom I made an unsuccess-

* A proposal was made to replace the houses that had been burnt, by similar buildings, and upon the same space of ground. Sir Christopher Wren opposed it, and with the following argument: "By so doing, you will show you have not *deserved* the late fire!"

ful application for this work, speaks of it, in his answer to my letter, in the following terms. "It is in such high estimation, that the late emperor Leopold, when grand duke of Tuscany, caused it to be re-printed at his own expence, and presented it to his friends. The consequence of this was, it influenced the owners of low marshy grounds, in the neighbourhood of the river Arno, to drain and cultivate them, and thereby rendered the abode of noxious air, and malignant fevers, a terrestrial paradise."

4. The summer and autumnal diseases of our country have often followed the erection of mill-dams. They may easily be obviated by surrounding those receptacles of water with trees, which prevent the sun's acting upon their shores, so as to exhale miasmata from them. Trees planted upon the sides of creeks and rivers, near a house, serve the same salutary purpose.

5. It has often been observed, that families enjoy good health, for many years, in the swamps of Delaware and North-Carolina, while they are in their natural state, but that sickness always follows the action of the rays of the sun upon the moist surface of the earth, after they are cleared. For this reason, the cultivation of a country should always fol-

low the cutting down of its timber, in order to prevent the new ground becoming, by its exhalations, a source of disease.

6. In commercial cities, no vessel that arrives with a cargo of putrescent articles should ever be suffered to approach a wharf, before the air that has been confined in her hold has been discharged. The same thing should be done after the arrival of a vessel from a distant or hot country, though her cargo be not capable of putrefaction, for air acquires a morbid quality by stagnating contiguous to wood, under circumstances formerly mentioned.

All these modes of removing the causes of malignant and yellow fevers, and of promoting strict and universal cleanliness, are of more consequence in the middle and northern states of America, than in countries uniformly warm, inasmuch as the disease may be taken as often as our inhabitants are exposed to its sources. In the West-Indies, a second attack of the yellow fever is prevented by the insensibility induced upon the system, by its being constantly exposed to the impressions of heat and exhalation. After a seasoning, as it is called, or a residence of two or three years in those islands, the miasmata affect the old settlers, as they do the natives, only with mild remittents. Nearly the

same thing takes place at Madras, in the East-Indies, where, Dr. Clark says, the exhalations which bring on bilious fevers, colic, cholera, and spasmodic affections in new comers, produce a puking in the morning, only in old residents. But very different is the condition of the inhabitants of the middle and northern states of America, in whom the winters prevent the acquisition of habits of insensibility to the heat and exhalations of the previous summers, and thus place them every year in the condition of new comers in the West and East-Indies, or of persons who have spent two or three years in a cold climate. This circumstance increases the danger of depopulation from our malignant epidemics, and should produce corresponding exertions to prevent them.

In enumerating the various means of preventing and exterminating the malignant forms of fever, it may appear strange that I have said nothing of the efficacy of quarantines for that purpose. Did I believe these pages would be read only by the citizens of Pennsylvania, I would do homage to their prejudices, by passing over this subject by a respectful and melancholy silence; but as it is probable they will fall into the hands of physicians and citizens of other states, I feel myself under an obligation to declare, that I believe quarantines are of no

efficacy in preventing the yellow fever, in any other way than by excluding the unwholesome air that is generated in the holds of ships, which may be done as easily in a single day, as in weeks or months. They originated in error, and have been kept up by a supine and traditional faith in the opinions and conduct of our ancestors in medicine. Millions of dollars have been wasted by them. From their influence, the commerce, agriculture, and manufactures of our country have suffered for many years. But this is not all. Thousands of lives have been sacrificed, by that faith in their efficacy, which has led to the neglect of domestic cleanliness. Distressing as these evils are, still greater have originated from them; for a belief in the contagious nature of the yellow fever, which is so solemnly enforced by the execution of quarantine laws, has demoralized our citizens. It has, in many instances, extinguished friendship, annihilated religion, and violated the sacraments of nature, by resisting even the loud and vehement cries of filial and parental blood.

While I thus deny the yellow fever to be the offspring of a specific contagion, and of course incapable of being imported so as to become an epidemic in any country, I shall admit presently, that the excretions of a patient in this disease may, by

confinement, become so acrid as to produce, under circumstances to be mentioned hereafter, a similar disease in a person, but from this person it cannot be communicated, if he possess only the common advantages of pure air and cleanliness. To enforce a quarantine law, therefore, under such a contingent circumstance, and at the expence of such a profusion of blessings as have been mentioned, is to imitate the conduct of the man, who, in attempting to kill a fly upon his child's forehead, knocked out its brains.

From the detail that has been given of the sources of malignant fevers, and of the means of preventing them, it is evident that they do not exist by an unchangeable law of nature, and that Heaven has surrendered every part of the globe to man, in a state capable of being inhabited, and enjoyed. The facts that have been mentioned show further, the connection of health and longevity, with the reason and labour of man.

To every natural evil the Author of Nature has kindly prepared an antidote. Pestilential fevers furnish no exception to this remark. The means of preventing them are as much under the power of human reason and industry, as the means of preventing the evils of lightning and common fire.

I am so satisfied of the truth of this opinion, that I look for a time when our courts of law shall punish cities and villages, for permitting any of the sources of bilious and malignant fevers to exist within their jurisdiction.

I have repeatedly asserted the yellow fever of the United States not to be contagious. I shall now mention the proofs of that assertion, and endeavour to explain instances of its supposed contagion upon other principles.

FACTS,

INTENDED TO PROVE

THE YELLOW FEVER

NOT TO BE CONTAGIOUS.

FACTS, &c.

WHEN fevers are communicated from one person to another, it is always in one of the following ways. 1. By secreted matters. 2. By excreted matters. The small-pox and measles are communicated in the former way; the jail, or, as it is sometimes called, the ship, or camp, and hospital fever, is communicated only by means of the excretions of the body. The perspiration, by acquiring a morbid and irritating quality more readily than any other excretion, in consequence of its stagnation and confinement to the body in a tedious jail fever, is the principal means of its propagation. The perspiration* is, moreover, predisposed to acquire this mor-

* The deleterious nature of this fluid, and its disposition to create disease, under the above circumstances, has been happily illustrated by Dr. Mitchill, in an ingenious letter to Dr. Duncan, of Edinburgh, published in the fourth volume of the Annals of Medicine.

bid and acrid quality by the filthiness, scanty, or bad aliment, and depression of mind, which generally precede that fever. It is confined to sailors, passengers, soldiers, prisoners, and patients, in foul and crowded ships, tents, jails, and hospitals, and to poor people who live in small, damp, and confined houses. It prevails chiefly in cool and cold weather, but is never epidemic; for the excreted matters which produce the fever do not float in the external atmosphere, nor are they communicated, so as to produce disease, more than a few feet from the persons who exhale them. They are sometimes communicated by means of the clothes which have been worn by the sick, and there have been instances in which the fever has been produced by persons who had not been confined by it, but who had previously been exposed to all the causes which generate it. It has been but little known in the United States since the revolutionary war, at which time it prevailed with great mortality in the hospitals and camps of the American army. It has now and then appeared in ships that were crowded with passengers from different parts of Europe. It is a common disease in the manufacturing towns of Great-Britain, where it has been the subject of several valuable publications, particularly by Dr. Smith and Dr. John Hunter. Dr. Haygarth has likewise written upon it, but he

has unfortunately confounded it with the West-India and American yellow fever, which differs from it in prevailing chiefly in warm climates and seasons; in being the offspring of dead and putrid vegetable and animal matters; in affecting chiefly young and robust habits; in being generally accompanied with a diseased state of the stomach, and an obstruction or preternatural secretion and excretion of bile; in terminating, most commonly, within seven days; in becoming epidemic *only* by means of an impure atmosphere; and in not furnishing ordinarily those excretions which, when received into other bodies, re-produce the same disease.

I have been compelled to employ this tedious description of two forms of fever, widely different from each other in their causes, symptoms, and duration, from the want of two words which shall designate them. Dr. Miller has boldly and ingeniously proposed to remedy this deficiency in our language, by calling the former *idio-miasmatic*, and the latter *koino-miasmatic* fevers, thereby denoting their *private* or *personal*, and their *public* or *common* origin*. My best wishes attend the adoption of those terms!

* Medical Repository, hexade ii. vol. i.

I return to remark, that the yellow fever is not contagious in its simple state, and that it spreads exclusively by means of exhalations from putrid matters, which are diffused in the air. This is evident from the following considerations:

1. It does not spread by contagion in the West-Indies. This has been proved in the most satisfactory manner by Drs. Hillary, Huck, Hunter, Hector M'Lean, Clark, Jackson, Borland, Pinckard, and Scott. Dr. Chisholm stands alone, among modern physicians, in maintaining a contrary opinion. It would be easy to prove, from many passages in the late edition of the doctor's learned and instructive volumes, that he has been mistaken; and that the disease was an endemic of every island in which he supposed it to be derived from contagion. A just idea of the great incorrectness of all his statements, in favour of his opinion, may be formed from the letter of J. F. Eckard, Esq. Danish consul, in Philadelphia, to Dr. James Mease, published in a late number of the New-York Medical Repository*.

* For February, March, and April, 1804.

2. The yellow fever does not spread in the country, when carried thither from the cities of the United States.

3. It does not spread in yellow fever hospitals, when they are situated beyond the influence of the impure air in which it is generated.

4. It does not spread in cities (as will appear hereafter) from any specific matter emitted from the bodies of sick people.

5. It generally requires the co-operation of an *exciting* cause, with miasmata, to produce it. This is never the case with diseases which are universally acknowledged to be contagious.

6. It is not propagated by the artificial means which propagate contagious diseases. Dr. Ffirth inoculated himself above twenty times, in different parts of his body, with the black matter discharged from the stomachs of patients in the yellow fever, and several times with the serum of the blood, and the saliva of patients ill with that disease, without being infected by them; nor was he indisposed after swallowing half an ounce of the black matter recently ejected from the stomach, nor by exposing himself to the vapour which was produced by

throwing a quantity of that matter upon iron heated over a fire*.

To the first four of these assertions there are some seeming exceptions in favour of the propagation of this fever by contagion. I shall briefly mention them, and endeavour to explain them upon other principles.

The circumstances which seem to favour the communication of the yellow fever from one person to another, by means of what has been supposed to be contagion, are as follow:

1. A patient being attended in a small, filthy, and *close* room. The excretions of the body, when thus accumulated, undergo an additional putrefactive process, and acquire the same properties as those putrid animal matters which are known to produce malignant fevers. I have heard of two or three instances in which a fever was produced by these means in the country, remote from the place where it originated, as well as from every external source of putrid exhalation. The plague is sometimes propagated in this way in the low and filthy huts which

* Inaugural Dissertation on Malignant Fever, &c. published in June, 1804.

compose the alleys and narrow streets of Cairo, Smyrna, and Constantinople.

2. A person sleeping in the sheets, or upon a bed impregnated with the sweats or other excretions, or being exposed to the smell of the foul linen, or other clothing of persons who had the yellow fever. The disease here, as in the former case, is communicated in the same way as from any other putrid animal matters. It was once received in Philadelphia from the effluvia of a chest of unwashed clothes, which had belonged to one of our citizens who had died with it in Barbadoes; but it extended no further in a large family than to the person who opened the chest. I have heard of but two instances more of its having been propagated by these means in the United States, in which case the disease perished with the unfortunate subjects of it.

To the above insolated cases of the yellow fever being produced by the clothing of persons who had died of it, I shall oppose a fact communicated to me by Dr. Mease. While the doctor resided at the lazaretto, as inspector of sickly vessels, between May, 1794, and the same month in 1798, the clothing contained in the chests and trunks of all the seamen and others, belonging to Philadelphia, who had died of the yellow fever in the West-

Indies, or on their passage home, and the linen of all the persons who had been sent from the city to the lazaretto with that disease, amounting in all to more than one hundred, were opened, exposed to the air, and washed, by the family of the steward of the hospital, and yet no one of them contracted the least indisposition from them.

I am disposed to believe the linen, or any other clothing of a person in good health that had been strongly impregnated with sweats, and afterwards suffered to putrify in a confined place, would be more apt to produce a yellow fever in a summer or autumnal month, than the linen of a person who had died of that disease, with the usual absence of a moisture on the skin. The changes which the healthy excretions by the pores undergo by putrefaction, may easily be conceived, by recollecting the offensive smell which a pocket-handkerchief acquires that has been used for two or three days to wipe away the sweat of the face and hands in warm weather*.

3. The protraction of a yellow fever to such a period as to dispose it to assume the symptoms, and to generate the peculiar and highly volatilised ex-

* See Van Swieten on Epidemic Diseases, Aphorism 1408.

halation from the pores of the skin which takes place in the jail fever. I am happy in finding I am not the author of this opinion. Sir John Pringle, Dr. Monro, and Dr. Hillary, speak of a contagious fever produced by the combined action of marsh and human miasmata. The first of those physicians supposes the Hungarian bilious fever, which prevailed over the continent of Europe in the seventeenth century, was sometimes propagated in this way, as well as by marsh and other putrid exhalations. Dr. Richard Pearson, in his observations upon the bilious fevers which prevailed in the neighbourhood of Birmingham, in England, in the years 1797, 1798, and 1799, has the folllowing remark: "In its first stage, this fever did not appear to be contagious, but it evidently was so after the eleventh and fourteenth day, when the *typhoid* state was induced*." As this protracted state of bilious fever rarely occurs in our country, it has seldom been communicated in this way.

It is not peculiar, I believe, to a bilious and yellow fever, when much protracted beyond its ordinary duration, to put on the symptoms of the jail fever. The same appearances occur in the pleurisy,

* Page 13.

and in other, of what Dr. Sydenham calls *intercurrent* fevers, all of which I have no doubt, under certain circumstances of filth, confinement, and long duration, would produce a fever in persons who were exposed to it. This fever, if the weather were cold, would probably put on inflammatory symptoms, and be added, in our nosologies, to the class of contagious diseases.

From the necessary influence of time, in thus rendering fevers of all kinds now and then contagious by excretion, it follows, that the yellow fever, when of its usual short duration, is incapable of generating that excretion, and that, instead of being considered as the only form of bilious fever that possesses a power of propagating itself, it should be considered as the only one that is devoid of it.

4. Miasmata, whether from marshes, or other external sources, acting upon a system previously impregnated with the excreted matters which produce the jail or ship fever. Mr. Lempriere informs us, that he saw what were supposed to be cases of yellow fever communicated by some sailors who brought the seeds of the ship fever with them to the island of Jamaica. The fevers which affected most of the crews of the Hussar frigate, mentioned

by Dr. Trotter*, and of the Busbridge Indiaman, described by Mr. Bryce†, appear to have been the effect of the combined operation of foul air in those ships, and human excretions, upon their systems. The disease was barely tinged with bilious symptoms, and hence the facility with which it was cured, for the jail fever more readily yields to medicine than the yellow fever. The former was probably excited by some latent exhalation from dead matters in the holds of the ships, and hence we find it ceased on shore, where it was deprived of its exciting cause. It is true, great pains were taken to clean the hold and decks of the Busbridge, but there are foul matters which adhere to the timbers of ships, and which, according to Dr. Lind, are sometimes generated by those timbers when new, that are not to be destroyed by any of the common means employed for that purpose. Of this Dr. Kollock has furnished us with a most satisfactory proof, in his history of the yellow fever, which prevailed on board of the frigate General Greene, on her voyage to the Havanna, in the year 1799. "The air in the hold of the vessel (says the doctor) was so contaminated, as to extinguish lights imme-

* Medicina Nautica, p. 360.

† Annals of Medicine, vol. i. p. 116.

diately, and candles in the cockpit were almost as useless from the same cause. The fish were thrown overboard, and the decks washed and scoured, the ventilator and wind sails put in motion, and every measure of purification adopted that their situation allowed; notwithstanding these precautions disease invaded us. The men were unceasing in their exertions to purify the ship; washing, scouring with vinegar, burning powder and vinegar, old junk, and sulphur, added to constant ventilation, proved unequal even to the amelioration of their calamities, while they were in the latitude of *great heat.* After the removal of the sick, the ship was disburthened of her stores, ballast, &c. cleansed and white-washed throughout; still new cases occurred for nearly two months. Some days, two, three, or four were sent off to the hospital, which would seem to indicate the retention of some portion of this noxious principle, which was lodged beyond the reach of the cleansing process." That this noxious principle or matter existed in the ship, and not in the bodies of the crew, is evident from its not having been communicated, in a single instance, by a hundred of them who were sent to an hospital on Rhode-Island, notwithstanding an intercourse sufficient to propagate it was necessarily

kept up with the inhabitants. Even their nurses did not take it*.

5. A fifth instance in which contagion has been supposed to take place in the yellow fever is, where the exhalation from the excretions of a patient in that disease acts as an *exciting* cause, in persons previously impregnated with the marsh, or other external miasmata, which produce it. The activity of this exhalation, even when it is attended with no smell, is so great, as to induce sickness, head-ach, vertigo, and fainting. It is not peculiar to the exhalations from such patients to produce morbid effects upon persons who visit them. The odour emitted by persons in the confluent small-pox has been known to produce the same symptoms, together with a subsequent fever and apthous sore throat. This has been remarked long ago by Dr. Lind, and latterly by Dr. Willan, in his Reports of the Diseases of London†. That the yellow fever is often excited in this way, without the intervention of a supposed specific contagion, I infer from its sometimes spreading through whole families, who have breathed the same impure atmosphere with the person first infected by the fever.

* Medical Repository, vol. iv. No. 1.

† Page 13 and 113.

This is more especially the case where the impression made by the exhalation from the sick person is assisted by fear, fatigue, or anxiety of mind in other branches of the family. In favour of this mode of exciting the yellow fever, Dr. Otto communicated to me the following fact. In the autumn of the year 1798, it prevailed upon the *shores* of the Delaware, in Gloucester county, in New-Jersey. A mild remittent prevailed at the same time on the *high* grounds, a few miles from the river. During this time, the doctor observed, if a person who had inhaled the seeds of the yellow fever in Philadelphia afterwards came into a family *near* the river, the same disease appeared in several instances in one or more branches of that family; but where persons brought the fever from the city, and went into a family on the *high* grounds, where the mild remittents prevailed, there was not a single instance of a yellow fever being excited by them in any of its members. This fact is important, and of extensive application. It places the stimulus from the breath, or other exhalations of persons affected by the yellow fever, upon a footing with intemperance, fatigue, heat, and all the common exciting causes of the disease; none of which, it is well known, can produce it, except in persons who have previously inhaled the putrid miasmata, which in all countries are its only remote cause. The

city of Philadelphia has furnished, in all our yellow fever years, many additional proofs of the correctness of Dr. Otto's remark. In the months of July and August, when miasmata are generally local, and float chiefly near to their hot beds, the docks and holds of ships, persons who are affected by these miasmata, and sicken in other parts of the city, never communicate the disease; but after the less prepared and heterogeneous filth of our whole city has been acted on by an autumnal, as well as summer sun, so as to emit pestilential exhalations into all our streets and alleys, the fever is now and then excited in the manner that has been mentioned, by a single person in a whole family. The common intermittents of the southern states are often excited in the same way, without being suspected of spreading by contagion. Even the jail or hospital fever is vindicated by Dr. Hunter from the highly contagious nature which has been ascribed to it, upon the same principle. His words, which are directly to my purpose, are as follow: "In considering the extent and power of the contagion [meaning of the jail or hospital fever], I am not inclined to impute to this cause the fevers of all those who are taken ill in one family after the first, as they are all along exposed to the same vitiated air which occasions the first fever. In like manner, when a poor woman visits some of her

sick neighbours, and is taken ill herself, and afterwards some of her children, I would not impute the disease to infection alone; she and her family having previously lived in the same kind of vitiated air which originally produced the fever. If the cases in which the infection meets with the poison already *half formed* be excepted, the disease in itself will be found to be much less infectious than has been commonly supposed*." By the modes of communicating the yellow fever which have been admitted, the dysentery, and all the milder forms of autumnal fevers, have been occasionally propagated, and perhaps oftener than the first-named disease, from their being more apt to run on to the typhus or chronic state. Of this I could adduce many proofs, not only from books, but from my own observations; but none of these diseases spread by contagion, or become epidemic from that cause in any country. A contrary opinion, I know, is held by Dr. Cleghorn, and Dr. Clarke; but they have deceived themselves, as they formerly deceived me, by not attending to the difference between secreted contagions and morbid excretions from the body, produced by the causes which have been enumerated, and which are rare and accidental concomitants of bilious or summer diseases.

* Medical Transactions, vol. iii. p. 351.

6. The last instance of supposed contagion of the yellow fever is said to arise from the effluvia of a putrid body that has died of that disease. The effluvia in this case act either as the putrified excretions mentioned under the first head, or as an exciting cause upon miasmata, previously received into the system. A dead body, in a state of putrefaction from any other disease, would produce, under the same circumstances of season and predisposition, the same kind and degrees of fever.

The similarity of the fever induced by the means that have been enumerated, with the fever from which it was derived, has been supposed to favour the opinion of its being communicated by a specific contagion. But let it be recollected that the yellow fever is, at the time of its being supposed to be thus received, the reigning epidemic, and that irritants of all kinds necessarily produce that disease. The morbid sweats which now and then produce an intermitting fever, and the alvine excretions which occasionally produce a dysentery, act only by exciting morbid actions in the system, which conform in their symptoms to an immutable and universal law of epidemics. It is only when those two diseases generally prevail, that they seem to produce each other.

Thus have I explained all the supposed cases of contagion of the yellow fever. To infer from the solitary instances of it thus excited, is to reason as incorrectly as to say the small-pox is not contagious, because we now and then meet with persons who cannot be infected by it.

From the explanation that has been given of the instances of supposed contagion of the yellow fever, we are compelled to resort to certain noxious qualities in the atmosphere, as the exclusive causes of the prevalence, not only of that fever, but (with a few exceptions) of all other epidemic diseases. It is true, we are as yet ignorant of the precise nature of those qualities in the air which produce epidemics; but their effects are as certainly felt by the human body as the effects of heat, and yet who knows the nature of that great and universal principle of activity in our globe?

That the yellow fever is propagated by means of an impure atmosphere, at all times, and in all places, I infer from the following facts:

1. It appears only in those climates and seasons of the year in which heat, acting upon moist animal and vegetable matters, fills the air with their putrid exhalations. A vertical sun, pouring its

beams for ages upon a dry soil; and swamps, defended from the influence of the sun by extensive forests, have not, in a single instance, produced this disease.

2. It is unknown in places where a connection is not perceptible between it, and marshes, mill-ponds, docks, gutters, sinks, unventilated ships, and other sources of noxious air. The truth of this remark is established by the testimonies of Dr. Lind and Dr. Chisholm, and by many facts in Lempriere's excellent History of the Diseases of Jamaica. Dr. Davidson furnished me with a striking confirmation of their remarks, in the following extract from a letter, dated November 12th, 1794. "I have mentioned (says the doctor) an instance of the remarkable good health which the 66th regiment enjoyed at St. Vincents for several years, upon a high hill above the town, removed from all exhalations, and in a situation kept at all times cool by the blowing of a constant trade wind. They did not lose, during eighteen months, above two or three men (the regiment was completed to the peace establishment), and during eight years they lost but two officers, one of whom, the quarter-master, resided constantly in town, and died from over fatigue; the other arrived very ill from Antigua, and died within a few days afterwards."

In the United States, no advocate for the specific nature or importation of the yellow fever, has ever been able to discover a single case of it beyond the influence of an atmosphere rendered impure by putrid exhalations.

It is no objection to the truth of this remark, that malignant bilious fevers sometimes appear upon the summits of hills, while their declivities, and the vallies below, are exempted from them. The miasmata, in all these cases, are arrested by those heights, and are always to be traced to putrefaction and exhalation in their neighbourhood. Nor is it any objection to the indissoluble connection between putrid exhalations and the yellow fever, which has been mentioned, that the disease sometimes appears in places remote from the source of miasmata in *time* and *place*. The bilious pleurisies, which occur in the winter and spring, after a sickly autumn, prove that they are retained in the body for many months, and although they are sometimes limited in their extent to a single house, and often to a village, a city, and the banks of a creek or river, yet they are now and then carried to a much greater distance. Mr. Lempriere, in his valuable Observations upon the Diseases of the British Army in Jamaica, informs us, that Kingston is sometimes rendered sickly by exhalations

from a lagoon, which lies *nine* miles to the eastward of that town*. The greater or less distance, to which miasmata are carried from the place where they are generated, appears to depend upon their quantity, upon the force and duration of currents of wind which act upon them, and upon their being more or less opposed by rivers, woods, water, houses, wells, or mountains.

3. It is destroyed, like its fraternal diseases, the common bilious and intermitting fevers, by means of *long-continued* and *heavy* rains†. When rains are heavy, but of short duration, they suspend it only in warm weather; but when they are succeeded by cold weather, they destroy all the forms of bilious fever. The malignant tertians, described by Dr. Cleghorn, always ceased about the autumnal equinox; for at that time, says the doctor, "Rain falls in such torrents as to tear up trees by the roots, carry away cattle, break down fences, and do considerable mischief to the gardens and vineyards; but, after a long and scorching summer, they are very acceptable and beneficial, for they mitigate the excessive heat of the air, and give

* Vol. i. p. 84.

† Clarke on the Diseases of Long Voyages to Hot Climates, p. 116.

a check to epidemical diseases*." There are facts, however, which would seem to contradict the assertion that miasmata are suspended or destroyed by heavy rains. Dr. Lind, in his Treatise upon the Diseases of Hot Climates, mentions instances in which they suddenly created fevers. It is probable, in these cases the rains may have had that effect, by disturbing the pellicle which time often throws over the surface of stagnating pools of water, and putrid matters on dry land. I was led to entertain this opinion by a fact mentioned in a letter I received from Dr. Davidson, dated November 4th, 1794. "Being ordered (says the doctor) up to Barbadoes, last November, upon service, I found that the troops had suffered considerably by that formidable scourge, the yellow fever. The season had been remarkably dry. It was observed, a rainy season contributed to make the season healthier, excepting at Constitution-Hill, where the sixth regiment was stationed, and where a heavy shower of rain seldom failed to bring back the fever, after it had ceased for some time. I found the barrack, where this regiment was, surrounded by a pond of brackish water, which, being but imperfectly drained by the continuance of the drought, the surface was covered with a green scum, which prevented

* Diseases of Minorca, p. 8.

the exhalation of marshy putrefaction. After a heavy shower of rain, this scum was broken, and the miasmata evolved, and acted with double force, according to the time of their secretion."

4. It is completely destroyed by frost. As neither rains nor frosts act in sick rooms, nor affect the bodies of sick people, they must annihilate the disease by acting exclusively upon the atmosphere. Very different in their nature are the small-pox and measles, which are propagated by specific contagion. They do not wait for the suns of July or August, nor do they require an impure atmosphere, or an exciting cause, to give them activity. They spread in the winter and spring, as well as in the summer and autumnal months: wet and dry weather do not arrest their progress, and frost (so fatal to the yellow fever), by rendering it necessary to exclude cold air from sick rooms, increases the force of their contagion, and thereby propagates them more certainly through a country.

5. It is likewise destroyed by intense heat, and high winds. The latter, we are sure, like heavy rains and frost, do not produce that salutary effect by acting upon the bodies, or in the rooms of sick people.

It is worthy of notice, that while the activity of miasmata is destroyed by cold, when it descends to frost; by heat, when it is so intense as to dry up all the sources of putrid exhalation; by heavy rains, when they are succeeded by cool weather; and by high winds, when they are not succeeded by warm weather; they are rendered more active by cool, warm, and damp weather, and by light winds. The influence of damp weather, in retaining and propagating miasmata, will be readily admitted, by recollecting how much more easily hounds track their prey, and how much more extensively odours of all kinds pervade the atmosphere, when it is charged with moisture, than in dry weather.

It has been asked, if putrid matters produce malignant bilious fevers in our cities, why do they not produce them in Lisbon, and in several other of the filthiest cities in the south of Europe? To this I answer, that filth and dirt are two distinct things. The streets of a city may be very *dirty*, that is, covered with mud composed of inoffensive clay, sand, or lime, and, at the same time, be perfectly free from those *filthy* vegetable and animal matters which, by putrefaction, contaminate the air. But, admitting the streets of those cities to abound with the filthy matters that produce pestilential diseases in other countries, it is possible the

exhalations from them may be so *constant*, and so *powerful*, in their impressions upon the bodies of the inhabitants, as to produce, from habit, no morbid effects, or but feeble diseases, as was remarked formerly, is the case in the natives and old settlers in the East and West-Indies. But if this explanation be not satisfactory, it may be resolved into a partial absence of an inflammatory constitution of the air, which, I shall say presently, must concur in producing pestilential diseases. Such deviations from uniformity in the works of Nature are universal. In the present instances, they no more invalidate the general proposition of malignant fevers being every where of domestic origin, than the exemption of Ireland from venomous reptiles, proves they are not generated in other countries, or that the pleurisy and rheumatism are not the effects of the alternate action of cold and heat upon the body, because hundreds, who have been exposed to them under equal circumstances, have not been affected by those diseases. There may be other parts of the world in which putrid matters do not produce bilious malignant diseases from the causes that have been mentioned, or from some unknown cause, but I am safe in repeating, there never was a bilious epidemic yellow fever that could not be traced to putrid exhalation.

It has been asked, if the yellow fever be not imported, why does it make its first appearance among sailors, and near the docks and wharves of our cities? I answer, this is far from being true. The disease has as often appeared first at a distance from the shores of our cities as near them, but, from its connection with a ship not being discovered, it has been called by another name. But where the first cases of it occur in sailors, I believe the seeds of it are always previously received by them from our filthy docks and wharves, or from the foul air which is discharged with the cargoes of the ships in which they have arrived, which seeds are readily excited in them by hard labour, or intemperance, so as to produce the disease. That this is the case, is further evident from its appearing in them, only in those months in which the bilious fever prevails in our cities.

It has been asked further, why were not these bilious malignant fevers more common before the years 1791, 1792, and 1793? To this I answer, by repeating what was mentioned in another place*, that our climate has been gradually undergoing a change. The summers are more alternated by hot and cool, and wet and dry weather, than in former

* Account of the Climate of Pennsylvania, vol i.

years. The winters are likewise less uniformly cold. Grass is two or three weeks later in the spring in affording pasture to cattle than it was within the memory of many thousand people. Above all, the summer has encroached upon the autumn, and hence the frequent accounts we read in our newspapers of trees blossoming, of full grown strawberries and raspberries being gathered, and of cherries and apples, of a considerable size, being seen, in the months of October and November, in all the middle states. By means of this protraction of the heat of summer, more time is given for the generation of putrid exhalations, and possibly for their greater concentration and activity in producing malignant bilious diseases.

It has been asked again, why do not the putrid matters which produce the yellow fever in some years produce it *every* year? This question might be answered by asking two others. 1st. Why, if the yellow fever be derived from the West-Indies, was it not imported every year before 1791, and before the existence, or during the feeble and partial operation of quarantine laws? It is no answer to this question to say, that a war is necessary to generate the disease in the islands, for it exists in some of them at all times, and the seasons of its prevalence in our cities have, in many instances,

had no connection with war, nor with the presence of European armies in those and in other sickly parts of the globe. During the seven years revolutionary war it was unknown as an epidemic in the United States, and yet sailors arrived in all our cities daily from sickly islands, in small and crowded vessels, and sometimes covered with the rags they had worn in the yellow fever, in British hospitals and jails. I ask, 2dly, why does the dysentery (which is certainly a domestic disease) rise up in our country, and spread sickness and death through whole families and villages, and disappear from the same places for fifteen or twenty years afterwards?

The want of uniformity in the exhalations of our country in producing those diseases depends upon their being combined with more or less heat or moisture; upon the surface of the earth being completely dry, or completely covered with water*;

* In the Account of the Yellow Fever of 1793, the different and opposite effects of a dry and rainy season in producing bilious fevers are mentioned from Dr. Dazilles. In the autumn of 1804, I have elsewhere remarked, after a summer in which there had fallen an unusual quantity of rain, the bilious fevers appeared chiefly on the high grounds in Pennsylvania, which were in a state of moisture, while scarcely a case of them appeared in the neighbourhood of

upon different currents of winds, or the total absence of wind; upon the disproportion of the temperature of the air in the day and night; upon the quantity of dew; upon the early or late appearance of warm or cold weather; and upon the predisposition of the body to disease, derived from the quality of the aliments of the season. A similar want of uniformity in the annual operations of our climate appears in the size and quality of grain, fruits, and vegetables of all kinds.

But the greater violence and mortality of our bilious fevers, than in former years, must be sought for chiefly in an inflammatory or malignant constitution of the atmosphere, the effects of which have been no less obvious upon the small-pox, measles, and the intercurrent fevers of Dr. Sydenham, than they are upon the summer and autumnal disease that has been mentioned.

This malignant state of the air has been noticed, under different names, by all the writers upon epidemics, from Hippocrates down to the present day. It was ascribed, by the venerable father of physic,

marshes, or low grounds, owing to their being so completely covered with water, as to be incapable of generating, by putrefaction, the miasmata which produce those forms of disease.

to a " divine something" in the atmosphere. Dr. Sydenham, whose works abound with references to it, supposes it to be derived from a mineral exhalation from the bowels of the earth. From numerous other testimonies of a belief in the influence of the insensible qualities of the air, altering the character of epidemics, I shall select the following :

" It is certain (says Dr. Mosely) that diseases undergo changes and revolutions. Some continue for a succession of years, and vanish when they have exhausted the temporary, but secret cause which produced them. Others have appeared and disappeared suddenly ; and others have their periodical returns."

The doctor ascribes a malignant fever among the dogs in Jamaica (improperly called, from one of its symptoms, hydrophobia), to a change in the atmosphere, in the year 1783. It was said to have been imported, but experience, he says, proved the fact to be otherwise*.

" This latent malignity in the atmosphere (says Baron Vansweiten) is known only by its effects, and cannot easily be reduced to any known species

* Treatise upon Tropical Diseases, p. 43, 44.

of acrimony." In another place he says, "It seems certain that this unknown matter disposes all the humours to a sudden and bad putrefaction*."

Dr. John Stedman has related many facts, in his Essay upon Insalutary Constitutions of the Air, which prove, that diseases are influenced by a quality in it, which, he says, "is productive of corruption," but which has hitherto eluded the researches of physicians†.

Mr. Lempriere, after mentioning the unusual mortality occasioned by the yellow fever, within the last five or six years, in the island of Jamaica, ascribes it wholly "to that particular constitution of atmosphere upon which the existence of epidemics, at one period rather than another, depend‡."

Not only diseases bear testimony to a change in the atmosphere, but the whole vegetable and animal creation concur in it, proofs of which were mentioned in another place. Three things are re-

* Commentaries on Boerhaave's Aphorisms, vol. v. p. 226, 230.

† Page 135.

‡ Vol. ii. p. 31.

markable with respect to this inflammatory constitution of the air.

1. It is sometimes of a local nature, and influences the diseases of a city, or country, while adjoining cities and countries are exempted from it.

2. It much oftener pervades a great extent of country. This was evident in the years 1793 and 1794, in the United States. During the same years, the yellow fever prevailed in most of the West-India islands. Many of the epidemics mentioned by Dr. Sims, in the first volume of the Medical Memoirs, affected, in the same years, the most remote parts of the continent of Europe. Even the ocean partakes of a morbid constitution of its atmosphere, and diseases at sea sympathise in violence with those of the land, at an immense distance from each other. This appears in a letter from a surgeon, on board a British ship of war, to Mr. Gooch, published in the third volume of his Medical and Surgical Observations.

3. The predisposing state of the atmosphere to induce malignant diseases continues for several years, under all the circumstances of wet and dry, and of hot and cold weather. This will appear, from attending to the accounts which have been

given of the weather, in all the years in which the yellow fever has prevailed in Philadelphia since 1792*. The remark is confirmed by all the records of malignant epidemics.

It is to no purpose to say, the presence of the peculiar matter which constitutes an inflammatory or malignant state of the air has not been detected by any chemical agents. The same thing has been justly said of the exhalations which produce the bilious intermitting, remitting, and yellow fever. No experiment that has yet been made, has discovered their presence in the air. The eudiometer has been used in vain for this purpose. In one experiment made by Dr. Gattani, the air from a marsh at the mouth of the river Vateline was found to be apparently purer by two degrees than the air on a neighbouring mountain, which was 2880 feet higher than the sea. The inhabitants of the mountain were notwithstanding healthy, while those who lived in the neighbourhood of the marsh were annually afflicted with bilious and intermitting fevers†. The contagions of the small-pox and measles consist of matter, and yet who has ever discovered this matter in the air? We infer the existence of

* Vol. iii. and iv.

† Alibert's Dissertation sur les Fievres Pernicieuses et Attaxiques Intermittentes, p. 185.

those remote causes of diseases in the atmosphere only from their effects. Of the existence of putrid exhalations in it, there are other evidences besides bilious and yellow fevers. They are sometimes the objects of the sense of smelling. We see them in the pale or sallow complexions of the inhabitants of the countries which generate them, and we observe them occasionally in the diseases of several domestic animals. The most frequent of these diseases are inflammation, tubercles, and ulcers in the liver. Dr. Cleghorn describes a diseased state of that viscus in cattle, in an unhealthy part of the island of Minorca. Dr. Grainger takes notice of several morbid appearances in the livers of domestic animals in Holland, in the year 1743. But the United States have furnished facts to illustrate the truth of this remark. Mr. James Wardrobe, near Richmond, in Virginia, informed me, that in August, 1794, at a time when bilious fevers were prevalent in his neighbourhood, his cattle were seized with a disease, which, I said formerly, is known by the name of the yellow water, and which appears to be a true yellow fever. They were attacked with a staggering. Their eyes were muddy, or ferocious. A costiveness attended in all cases. It killed in two days. Fifty-two of his cattle perished by it. Upon opening the bodies of several of them, he found the liver swelled and ul-

cerated. The blood was dissolved in the veins. In the bladder of one of them, he found thirteen pints of blood and water. Similar appearances were observed in the livers of sheep in the neighbourhood of Cadiz, in the year 1799, during the prevalence of the yellow fever in that city. They were considered as such unequivocal marks of an unwholesome atmosphere among the ancients, that they examined the livers of domestic animals, in order to determine on the healthy or unhealthy situation of the spot on which they wished to live.

The advocates for the yellow fever being a specific disease, and propagated only by contagion, will gain nothing by denying an inflammatory constitution of the atmosphere (the cause of which is unknown to us) to be necessary to raise common remittents to that grade in which they become malignant yellow fevers; for they are obliged to have recourse to an unknown quality in the air, every time they are called upon to account for the disease prevailing chiefly in our cities, and not spreading when it is carried from them into the country. The same reference to an occult quality in the air is had by all the writers upon the plague, in accounting for its immediate and total extinction, when it is carried into a foreign port.

In speaking of the influence of an inflammatory constitution of the atmosphere in raising common bilious, to malignant yellow fevers, I wish not to have it supposed, that its concurrence is necessary to produce sporadic cases of that, or any other malignant disease. Strong exciting causes, combined with highly volatilized and active miasmata, I believe, will produce a yellow fever at any time. I have seen one or more such cases almost every year since I settled in Philadelphia, and particularly when my business was confined chiefly to that class of people who live near the wharves, and in the suburbs, and who are still the first, and frequently the only victims of the yellow fever.

It has been said, exultingly, that the opinion of the importation of the yellow fever is of great antiquity in our country, and that it has lately been admitted by the most respectable physicians in Britain and France, and sanctioned by the laws of several of the governments in Europe. Had antiquity, numbers, rank, and power been just arguments in favour of existing opinions, a thousand truths would have perished in their birth, which have diffused light and happiness over every part of our globe. In favour of the ancient and general belief of the importation of the yellow fever, there are several obvi-

ous reasons. The idea is produced by a single act of the mind. It requires neither comparison nor reasoning to adopt it, and therefore accords with the natural indolence of man. It, moreover, flatters his avarice and pride, by throwing the origin of a mortal disease from his property and country. The principle of thus referring the origin of the evils of life from ourselves to others is universal. It began in paradise, and has ever since been an essential feature in the character of our species. It has constantly led individuals and nations to consider loathsome and dangerous diseases as of foreign extraction. The venereal disease and the leprosy have no native country, if we believe all the authors who have written upon them. Prosper Alpinus derives the plagues of Cairo from Syria, and the physicians of of Alexandria import them from Smyrna or Constantinople. The yellow fever is said to have been first brought from Siam (where there are proofs it never existed) to the West-Indies, whence it is believed to be imported into the cities of the United States. From them, Frenchmen and Spaniards say it has been re-shipped, directly or indirectly, to St. Domingo, Havanna, Malaga, Cadiz, and other parts of the world. Weak and absurd credulity! the causes of the ferocious and mortal disease which we thus thrust from our respective ports,

like the sin of Cain, "lie exclusively at our own doors."

Lastly, it has been asserted, if we admit the yellow fever to be an indigenous disease of our cities, we shall destroy their commerce, and the value of property in them, by disseminating a belief, that the cause of our disease is fixed in our climate, and that it is out of the power of human means to remove it. The reverse of this supposition is true. If it be an imported disease, our case is without a remedy; for if, with all the advantages of quarantine laws enforced by severe penalties, and executed in the most despotic manner, the disease has existed annually, in most of our cities, as an epidemic, or in sporadic cases, ever since the year 1791, it will be in vain to expect, from similar measures, a future exemption from it. Nothing but a belief in its domestic origin, and the adoption of means founded upon that belief, can restore the character of our climate, and save our commercial cities from destruction. Those means are cheap, practicable, and certain. They have succeeded, as I shall say presently, in other countries.

From the account that has been given of the different ways in which this disease is communicated

from one person to another, and from the facts which establish its propagation exclusively through the medium of the atmosphere, when it becomes epidemic, we may explain several things which belong to its history, that are inexplicable upon the principle of its specific contagion.

1. We learn the reason why, in some instances, the fever does not spread from a person who sickens or dies at sea, who had carried the seeds of it in his body from a sickly shore. It is because no febrile miasmata exist in the bodies of the rest of the crew to be excited into action by any peculiar smell from the disease, or by fear or fatigue, and because no morbid excretions are generated by the person who dies. The fever which prevailed on board the Nottingham East-Indiaman, in the year 1766, affected those forty men only, who had slept on shore on the island of Joanna twenty days before. Had the whole crew been on shore, the disease would probably have affected them all, and been ascribed to contagion generated by the first persons who were confined by it*. A Danish ship, in the year 1768,

* Observations on the Bilious Fevers usual in voyages to the East-Indies, by James Badinach, M. D. Medical Observations and Inquiries, vol. iv.

sent twelve of her crew on shore for water. They were all seized after their return to the ship with a malignant fever, and died without infecting any person on board, and from the same causes which preserved the crew of the Nottingham Indiaman*.

2. We learn the reason why the disease sometimes spreads through a whole ship's crew, apparently from one or more affected persons. It is either because they have been confined to small and close births by bad weather, or because the fever has been protracted to a typhus or chronic state, or because the bodies of the whole crew are impregnated with morbid miasmata, and thus predisposed to have the disease excited in the manner that has been mentioned. In the last way it was excited in most of the crew of the United States frigate, in the Delaware, opposite to the city of Philadelphia, in the year 1797. It appears to have spread, from a similar cause, from a few sailors, on board the Grenville Indiaman, after touching at Batavia. The whole crew had been predisposed to the disease by inhaling the noxious air of that island.

† Clarke on the Diseases of Long Voyages to Hot Climates, p. 123, 125.

The same reasons account for the fever expiring in a healthy village or country; also for its spreading when carried to those towns which are seated upon creeks or rivers, and in the neighbourhood of marsh exhalations. It has uniformly perished in the high and healthy village of Germantown, when carried from Philadelphia, and has three times appeared to be contagious near the muddy shores of the creeks which flow through Wilmington and Chester.

3. From the facts that have been mentioned, we are taught to disbelieve the possibility of the disease being imported in the masts and sails of a ship, by a contagious matter secreted by a sailor who may have sickened or died on board her, on a passage from a West-India island. The death in most of the cases supposed to be imported, in this way, occurs within a few days after the ship leaves her West-India port, or within a few days after her arrival. In the former case, the disease is derived from West-India miasmata; in the latter, it is derived, as was before remarked, either from the foul air of the hold of the ship, or of the dock or wharf to which the ship is moored.

Many other facts might be adduced to show the yellow fever not to be an imported disease. It has

often prevailed among the Indians remote from the sea coast, and many hundred cases of it have occurred, since the year 1793, on the inland waters of the United States, from the Hudson and Susquehanna, to the rivers of the Mississippi. In South-America, Baron Humboldt assured me, it is every where believed to be an endemic of that country.

These simple and connected facts, in which all the physicians in the United States who derive the yellow fever from domestic causes have agreed, will receive fresh support by comparing them with the different and contrary opinions of the physicians who maintain its importation. Some of them have asserted it to be a specific disease, and derived it from the East and West-Indies; others derive it from Beulam, on the coast of Africa; a third sect have called it a ship fever; a fourth have ascribed it to a mixture of imported contagion with the foul air of our cities; while a fifth, who believed it to be imported in 1793, have supposed it to be the offspring of a contagion left by the disease of that year, revived by the heat of our summers, and disseminated, ever since, through the different cities of our country. The number of these opinions, clearly proves, that no one of them is tenable.

A belief in the non-contagion of the yellow fever, or of its being incommunicable except in one of the five ways that have been mentioned, is calculated to produce the following good effects :

1. It will deliver the states which have sea-ports from four-fifths of the expences of their present quarantine laws and lazarettoes. A very small apparatus, in laws and officers, would be sufficient to prevent the landing of persons affected by the ship fever in our cities, and the more dangerous practice, of ships pouring streams of pestilential air, from their holds, upon the citizens who live near our docks and wharves.

2. It will deliver our merchants from the losses incurred by the delays of their ships, by long and unnecessary quarantines. It will, moreover, tend to procure the immediate admission of our ships into foreign ports, by removing that belief in the contagious nature of the yellow fever, which originated in our country, and which has been spread, by the public acts of our legislatures and boards of health, throughout the globe.

3. It will deliver our citizens from the danger to which they are exposed, by spending the time of the quarantine, on board of vessels in the neigh-

bourhood of the marshes, which form the shores of the rivers or coasts of quarantine roads. This danger is much increased by idleness, and by the vexation which is excited, by sailors and passengers being detained, unnecessarily, fifteen or twenty days from their business and friends.

4. It will lead us to a speedy removal of all the excretions, and a constant ventilation of the rooms of patients in the yellow fever, and thereby to prevent the accumulation, and further putrefaction of those exhalations which may reproduce it.

5. It is calculated to prevent the desertion of patients in the yellow fever, by their friends and families, and to produce caution in them to prevent the excitement of the disease in their own bodies, by means of low diet and gentle physic, proportioned to the impurity of the air, and to the anxiety and fatigue to which they are exposed in attending the sick.

6. It will put an end to the cruel practice of quieting the groundless fears of a whole neighbourhood, by removing the poor who are affected by the fever, from their houses, and conveying them, half dead with disease and terror, to a solitary or crowded hospital, or of nailing a yellow flag upon

the doors of others, or of fixing a guard before them, both of which have been practised in Philadelphia, not only without any good effect, but to the great injury of the sick.

7. By deriving the fever from our own climate and atmosphere, we shall be able to foresee its approach in the increased violence of common diseases, in the morbid state of vegetation, in the course of the winds, in the diseases of certain brute animals, and in the increase of common, or the appearance of uncommon insects.

8. A belief in the non-contagion of the yellow fever, and its general prevalence from putrid animal and vegetable matters *only*, is calculated to lead us to drain or cover marshy grounds, and to remove from our cities all the sources of impure air, whether they exist in the holds of ships, in docks, gutters, and common sewers, or in privies, gardens, yards, and cellars, more especially during the existence of the signs of a malignant constitution of the air. A fever, the same in its causes, and similar to it in many of its symptoms, that is, the plague, has been extirpated, by extraordinary degrees of cleanliness, from the cities of Holland, Great-Britain, and several other parts of Europe.

The reader will perceive, from these facts and reasonings, that I have relinquished the opinion published in my account of the yellow fever in the years 1793, 1794, and 1797, respecting its contagious nature. I was misled by Dr. Lining, and several West-India writers, in ascribing a much greater extent to the excreted matters in producing the disease, than I have since discovered to be correct, and by Bianchi, Lind, Clark, and Cleghorn, in admitting even the common bilious fever to be contagious. The reader will perceive, likewise, that I have changed my opinion respecting one of the modes in which the plague is propagated. I once believed, upon the authorities of travellers, physicians, and schools of medicine, that it was a highly contagious disease. I am now satisfied this is not the case; but, from the greater number of people who are depressed and debilitated by poverty and famine, and who live in small and filthy huts* in the cities of the east, than in the cities of the United States, I still believe it to be more frequently communicated from an intercourse with sick people by the morbid excretions of the body, than the yellow fever is in our country. For the change of my opinion upon this subject, I am

* M. Savary, in his Travels, says, two hundred persons live in Cairo within a compass that accommodates but thirty persons in Paris.

indebted to Dr. Caldwell's and Mr. Webster's publications upon pestilential diseases, and to the travels of Mariti and Sonnini into Syria and Egypt. I reject, of course, with the contagious quality of the plague, the idea of its ever being imported into any country so as to become epidemic, by means of a knife-case, a piece of cotton, or a bale of silks, with the same decision that I do all the improbable and contradictory reports of an epidemic yellow fever being imported in a sailor's jacket, or in the timbers and sails of a ship that had been washed by the salt water, and fanned by the pure air of the ocean, for several weeks, on her passage from the West-Indies to the United States.

It gives me pleasure to find this unpopular opinion of the non-contagion of the plague is not a new one. It was held by the Faculty of Medicine in Paris, in the beginning of the eighteenth century, and it has since been defended by Dr. Stoll, of Vienna, Dr. Samoilowitz, of Russia, and several other eminent physicians. Dr. Herberden has lately called in question the truth of all the stories that are upon record of the plague having been imported into England in the last century, and the researches of Sir Robert Wilson of the British army, and of Assellini, and several other French phy-

sicians, have produced the most satisfactory proofs of its not being a contagious disease in its native country. A discovery more pregnant with blessings to mankind has seldom been made. Pyramids of error, the works of successive ages and nations, must fall before it, and rivers of tears must be dried up by it. It is impossible fully to appreciate the immense benefits which await this mighty achievement of our science upon the affairs of the globe. Large cities shall no longer be the hot-beds of disease and death. Marshy grounds, teeming with pestilential exhalations, shall become the healthy abodes of men. A powerful source of repulsion between nations shall be removed, and commerce shall shake off the fetters which have been imposed upon it by expensive and vexatious quarantines. A red or a yellow eye shall no longer be the signal to desert a friend or a brother to perish alone in a garret or a barn, nor to expel the stranger from our houses, to seek an asylum in a public hospital, to avoid dying in the street. The number of diseases shall be lessened, and the most mortal of them shall be struck out of the list of human evils. To accelerate these events, it is incumbent upon the physicians of the United States to second the discoveries of their European brethren. It becomes them constantly to recollect, that we are

the centinels of the health and lives of our fellow-citizens, and that there is a grade of benevolence in our profession much higher than that which arises from the cure of diseases. It consists in exterminating their causes.

A DEFENCE

OF

BLOOD-LETTING,

AS A

REMEDY FOR CERTAIN DISEASES.

DEFENCE OF BLOOD-LETTING.

BLOOD-LETTING, as a remedy for fevers, and certain other diseases, having lately been the subject of much discussion, and many objections having been made to it, which appear to be founded in error and fear, I have considered that a defence of it, by removing those objections, might render it more generally useful, in every part of the United States.

I shall begin this subject by remarking, that blood-letting is indicated, in fevers of great morbid excitement,

1. By the sudden suppression or diminution of the natural discharges by the pores, bowels, and kidneys, whereby a plethora is induced in the system.

2. By the habits of the persons who are most subject to such fevers.

3. By the theory of fever. I have attempted to prove that the higher grades of fever depend upon morbid and excessive action in the blood-vessels. It is connected, of course, with preternatural sensibility in their muscular fibres. The blood is the most powerful irritant which acts upon them. By abstracting a part of it, we lessen the principal cause of the fever. The effect of blood-letting is as immediate and natural in removing fever, as the the abstraction of a particle of sand is, to cure an inflammation of the eye, when it arises from that cause.

4. By the symptoms of the first stage of violent fevers, such as a sleepiness and an oppressed pulse, or by delirium, with a throbbing pulse, and great pains in every part of the body.

5. By the rupture of the blood-vessels, which takes place from the quantity or impetus of the blood in fevers of great morbid action. Let no one call bleeding a cruel or unnatural remedy. It is one of the specifics of nature; but in the use of it she seldom affords much relief. She frequently pours the stimulating and oppressing mass of blood

into the lungs and brain; and when she finds an outlet for it through the nose, it is discharged either in such a deficient or excessive quantity, as to be useless or hurtful. By artificial blood-letting, we can chuse the *time* and *place* of drawing blood, and we may regulate its quantity by the degrees of action in the blood-vessels. The disposition of nature to cure violent morbid action by depletion, is further manifested by her substituting, in the room of blood-letting, large, but less safe and less beneficial, evacuations from the stomach and bowels.

6. By the relief which is obtained in fevers of violent action by remedies of less efficacy (to be mentioned hereafter), which act indirectly in reducing the force of the sanguiferous system.

7. By the immense advantages which have attended the use of blood-letting in violent fevers, when used at a proper time, and in a quantity suited to the force of the disease. I shall briefly enumerate these advantages.

1. It frequently strangles a fever, when used in its forming state, and thereby saves much pain, time, and expence to a patient.

2. It imparts strength to the body, by removing the depression which is induced by the remote cause of the fever. It moreover obviates a disposition to faint, which arises from this state of the system.

3. It reduces the uncommon frequency of the pulse. The loss of ten ounces of blood reduced Miss Sally Eyre's pulse from 176 strokes to 140, in a few minutes, in the fever of the year 1794. Dr. Gordon mentions many similar instances of its reducing the frequency of the pulse, in the puerperile fever.

4. It renders the pulse more frequent when it is preternaturally slow.

5. It checks the nausea and vomiting, which attend the malignant state of fever. Of this I saw many instances in the year 1794. Dr. Poissonnier Desperrieres confirms this remark, in his Account of the Fevers of St. Domingo; and adds further, that it prevents, when sufficiently copious, the troublesome vomiting which often occurs on the fifth day of the yellow fever*. It has the same effect in preventing the diarrhœa in the measles.

* Traite des Fievres de l'Isle de St. Domingue, vol. ii. p. 76.

6. It renders the bowels, when costive, more easily moved by purging physic.

7. It renders the action of mercury more speedy and more certain, in exciting a salivation.

8. It disposes the body to sweat spontaneously, or renders diluting and diaphoretic medicines more effectual for that purpose.

9. It *suddenly* removes a dryness, and *gradually* a blackness, from the tongue. Of the former effect of bleeding, I saw two instances, and of the latter, one, during the autumn of 1794.

10. It removes or lessens pain in every part of the body, and more especially in the head.

11. It removes or lessens the burning heat of the skin, and the burning heat in the stomach, so common and so distressing in the yellow fever.

12. It removes a constant chilliness, which sometimes continues for several days, and which will neither yield to cordial drinks, nor warm bedclothes.

13. It checks such sweats as are profuse without affording relief, and renders such as are partial and moderate, universal and salutary.

14. It sometimes checks a diarrhœa and tenesmus, after astringent medicines have been given to no purpose. This has often been observed in the measles.

15. It suddenly cures the intolerance of light which accompanies many of the inflammatory states of fever.

16. It removes coma. Mr. Henry Clymer was suddenly relieved of this alarming symptom, in the fever of 1794, by the loss of twelve ounces of blood.

17. It induces sleep. This effect of bleeding is so uniform, that it obtained, in the year 1794, the name of an anodyne in several families. Sleep sometimes stole upon the patient while the blood was flowing.

18. It prevents effusions of serum and blood. Hæmorrhages seldom occur, where bleeding has been sufficiently copious.

19. It belongs to this remedy to prevent the chronic diseases of cough, consumption, jaundice, abscess in the liver, and all the different states of dropsy which so often follow autumnal fevers.

My amiable friend, Mrs. Lenox, furnished an exception to this remark, in the year 1794. After having been cured of the yellow fever by seven bleedings, she was affected, in consequence of taking a ride, with a slight return of fever, accompanied by an acute pain in the head, and some of the symptoms of a dropsy of the brain. As her pulse was tense and quick, I advised repeated bleedings to remove it. This prescription, for reasons which it is unnecessary to relate, was not followed at the time, or in the manner, in which it was recommended. The pain, in the mean time, became more alarming. In this situation, two physicians were proposed by her friends to consult with me. I objected to them both, because I knew their principles and modes of practice to be contrary to mine, and that they were proposed only with a view of wresting the lancet from my hand. From this desire of avoiding a controversy with my brethren, where conviction was impossible on either side, as well as to obviate all cause of complaint by my patient's friends, I offered to take my leave of her, and to resign her wholly to the care of the two gen-

tlemen who were proposed to attend her with me. To this she objected in a decided manner. But that I might not be suspected of an undue reliance upon my own judgment, I proposed to call upon Dr. Griffitts or Dr. Physick to assist me in my attendance upon her. Both these physicians had renounced the prejudices of the schools in which they had been educated, and had conformed their principles and practice to the present improving state of medical science. My patient preferred Dr. Griffitts, who, in his first visit to her, as soon as he felt her pulse, proposed more bleeding. The operation was performed by the doctor himself, and repeated daily for five days afterwards. From an apprehension that the disease was so fixed as to require some aid to blood-letting, we gave her calomel in such large doses as to excite a salivation. By the use of these remedies she recovered slowly, but so perfectly as to enjoy her usual health.

20. Bleeding prevents the termination of malignant, in the gangrenous state of fever. This effect of blood-letting will enable us to understand some things in the writings of Dr. Morton and Dr. Sydenham, which at first sight appear to be unintelligible. Dr. Morton describes what he calls a putrid fever, which was epidemic and fatal, in the year 1678. Dr. Sydenham, who practised in Lon-

don at the same time, takes no notice of this fever. The reason of his silence is obvious. By copious bleeding, he prevented the fever of that year from running on to the gangrenous state, while Dr. Morton, by neglecting to bleed, created the supposed putrid fevers which he has described.

It has been common to charge the friends of blood-letting with *temerity* in their practice. From this view which has been given of it, it appears, that it would be more proper to ascribe *timidity* to them, for they bleed to prevent the offensive and distressing consequences of neglecting it, which have been mentioned.

21. It cures, without permitting a fever to put on those alarming symptoms, which excite constant apprehensions of danger and death, in the minds of patients and their friends. It is because these alarming symptoms are prevented, by bleeding, that patients are sometimes unwilling to believe they have been cured by it, of a malignant fever. Thus, the Syrian leper of old, viewed the water of Jordan as too simple and too common to cure a formidable disease, without recollecting that the remedies for the greatest evils of life are all simple, and within the power of the greatest part of mankind.

22. It prepares the way for the successful use of the bark and other tonic remedies, by destroying, or so far weakening, a morbid action in the blood-vessels, that a medicine of a moderate stimulus afterwards exceeds it in force, and thereby restores equable and healthy action to the system.

23. Bleeding prevents relapses. It, moreover, prevents that predisposition to the intermitting and pleuritic states of fever, which so frequently attack persons in the spring, who have had the bilious remitting fever in the preceding autumn.

But great and numerous as the advantages of blood-letting are in fevers, there have been many objections to it. I shall briefly enumerate, and endeavour to refute the errors upon this subject.

Blood-letting has been forbidden by physicians, by the following circumstances, and states of the system.

1. By warm weather. Galen bled in a plague, and Aræteus in a bilious fever, in a warm climate. Dr. Sydenham and Dr. Hillary inform us, that the most inflammatory fevers occur in, and succeed hot weather. Dr. Cleghorn prescribed it copiously in the warm months, in Minorca. Dr.

Mosely cured the yellow fever by this remedy, in Jamaica. Dr. Broadbelt, and Dr. Weston, in the same island, have lately adopted his successful practice. Dr. Desportes speaks in the highest terms of it in all the inflammatory diseases of St. Domingo. He complains of the neglect of it in the rheumatism, in consequence of which, he says, the disease produces abscesses in the lungs*. I have never, in any year of my practice, been restrained by the heat of summer in the use of the lancet, where the pulse has indicated it to be necessary, and have always found the same advantages from it, as when I have prescribed it in the winter or spring months.

In thus deciding in favour of bleeding in warm weather, I do not mean to defend its use to the same extent, as to diseases, or to quantity, in the native and long settled inhabitants of hot climates, as in persons who have recently migrated to them, or who live in climates alternately hot and cold.

2. Being born, and having lived in a warm climate. This is so far from being an objection to blood-letting in an inflammatory disease, that it renders it more necessary. I think I have lost seve-

* Page 35.

ral West-India patients from the influence of this error.

3. Great apparent weakness. This, in acute and violent fevers, is always from a depressed state of the system. It resembles, in so many particulars, that weakness which is the effect of the abstraction of stimulus, that it is no wonder they have been confounded by physicians. This sameness of symptoms from opposite states of the system is taken notice of by Hippocrates. He describes convulsions, and particularly a hiccup, as occurring equally from repletion and inanition, which answer to the terms of depression, and debility from action and abstraction. The natural remedy for the former is depletion, and no mode of depleting is so effectual or safe as blood-letting. But the great objection to this remedy is, when a fever of great morbid excitement affects persons of delicate constitutions, and such as have long been subject to debility of the chronic kind. In this state of the system there is the same morbid and preternatural action in the blood-vessels, that there is in persons of robust habits, and the same remedy is necessary to subdue it in both cases. It is sometimes indicated in a larger quantity in weakly than in robust people, by the plethora which is more easily induced in their relaxed and yielding blood-vessels, and by

the greater facility with which ruptures and effusions take place in their viscera. Thus it is more necessary to throw overboard a large part of the cargo of an old and leaky vessel in a storm, than of a new and strong one. I know that vomits, purges, sweats, and other evacuating remedies, are preferred to bleeding in weakly constitutions, but I hope to show hereafter, that bleeding is not only more effectual, but more safe in such habits, than any other depleting remedy.

4. Infancy and childhood. This is so far from being an objection to bleeding, that the excitable state of the blood-vessels in those periods of life, renders it peculiarly necessary in their inflammatory diseases. Dr. Sydenham bled children in the hooping cough, and in dentition. I have followed his practice, and bled as freely in the violent states of fever in infancy as in middle life. I bled my eldest daughter when she was but six weeks old, for convulsions brought on by an excessive dose of laudanum given to her by her nurse; and I bled one of my sons twice, before he was two months old, for an acute fever which fell upon his lungs and bowels. In both cases, life appeared to be saved by this remedy.

5. Old age. The increase of appetite in old people, their inability to use sufficient exercise, whereby their blood-vessels become relaxed, plethoric, and excitable, and above all, the translation of the strength of the muscles to the arteries, and of plethora to the veins, all indicate bleeding to be more necessary (in equal circumstances) in old, than in middle aged people. My practice in the diseases of old people has long been regulated by the above facts. I bled Mrs. Fullarton twice in a pleurisy in January, 1804, in the 84th year of her age, and thereby cured her disease. I am not the author of this practice. Botallus left a testimony in favour of it nearly 200 years ago*, and it has since been confirmed by the experience of Hoffman, and many other physicians. An ignorance of, or inattention to this change in the state of the blood-vessels, in persons in the decline of life, and the neglect of the only remedy indicated by it, is probably the reason why diseases often prove fatal to them, which in early or middle life cured themselves, or yielded to a single dose of physic, or a few ounces of bark.

* Magis esse adjuvandos senes, missione sanguinis dum morbus postulat, aut corpus eorum habitus malus est, quam ubi hæc (quod absonum videbitur) juvenibus contingunt.

De Cur. per Sang. missionem, cap. 11. § 11.

6. The time of menstruation. The uterus, during this period, is in an inflamed state, and the whole system is plethoric and excitable, and of course disposed to a violent degree of fever, from all the causes which excite it. Bleeding, therefore, is more indicated, in fever of great morbid action, at this time, than at any other. Formerly the natural discharge from the uterus was trusted to, to remove a fever contracted during the time of menstruation; but what relief can the discharge of four or five ounces of blood from the uterus afford, in a fever which requires the loss of 50, or perhaps of 100 ounces to cure it?

7. Pregnancy. The inflammation and distention induced upon the uterus directly, and indirectly upon the whole system by pregnancy, render bleeding, in the acute states of fever, more necessary than at other times. I have elsewhere mentioned the advantages of bleeding pregnant women, in the yellow fever. I did not learn the advantages of the practice in that disease. I bled Mrs. Philler 11 times in seven days, in a pleurisy during her pregnancy, in the month of March, 1783. Mrs. Fiss was bled 13 times in the spring of 1783; and Mrs. Kirby 16 times in the same condition, by my orders, in the winter of 1786, in a similar disease. All these women recovered, and the children they

carried during their illness, are at this time alive, and in good health.

8. Fainting after bleeding. This symptom is accidental in many people. No inference can be drawn from it against blood-letting. It often occurs after the first and second bleedings in a fever, but in no subsequent bleeding, though it be repeated a dozen times. Of this I saw several instances, in the yellow fever of 1794. The pulse, during the fainting, is often tense and full.

9. Coldness of the extremities, and of the whole body. This cold state of fever when it occurs early, yields more readily to bleeding, than to the most cordial medicines.

10. Sweats are supposed to forbid blood-letting. I have seen two instances of death, from leaving a paroxysm of malignant fever to terminate itself by sweating. Dr. Sydenham has taught a contrary practice in the following case. "While this constitution (says the doctor) prevailed, I was called to Dr. Morice, who then practised in London. He had this fever, attended with profuse sweats, and numerous petechiæ. By the consent of some other physicians, our joint friends, he was blooded, and rose from his bed, his body being first wiped dry.

He found immediate relief from the use of a cooling diet and medicines, the dangerous symptoms soon going off; and by continuing this method he recovered in a few days*." In the same fever, the doctor adds further, "For though one might expect great advantages in pursuing an indication taken from what generally proves serviceable (viz. sweating), yet I have found, by constant experience, that the patient not only finds no relief, but, contrariwise, is more heated thereby; so that frequently a delirium, petechiæ, and other very dangerous symptoms immediately succeed such *sweats*†."

Morgagni describes a malignant fever which prevailed in Italy, in which the patients died in profuse sweats, while their physicians were looking for a crisis from them. Bleeding would probably have checked these sweats, and cured the fever.

11. Dissolved blood, and an absence of an inflammatory crust on its crassamentum. I shall hereafter place dissolved blood at the highest point of a scale, which is intended to mark the different degrees of morbid action in the system. I have mentioned, in the Outlines of a Theory of Fe-

* Wallis's edition, vol. i. p. 210.

† Vol. i. p. 208.

ver, that it is the effect of a tendency to a palsy, induced by the violent force of impression upon the blood-vessels. This appearance of the blood in certain states of fever, instead of forbidding bleeding, is the most vehement call of the system for it. Nor is the absence of a crust on the crassamentum of the blood, a proof of the absence of great morbid diathesis, or a signal to lay aside the lancet. On the contrary, I shall show hereafter, that there are several appearances of the blood which indicate more morbid action in the blood-vessels than a sizy or inflammatory crust.

12. An undue proportion of serum to crassamentum in the blood. This predominance of water in the blood has often checked sufficient blood-letting. But it should be constantly disregarded while it is attended with those states of pulse (to be mentioned hereafter) which require bleeding.

14. The presence of petechiæ on the skin. These, I have elsewhere said, are the effects of the gangrenous state of fever. Dr. Sydenham and Dr. de Haen have taught the safety and advantage of bleeding, when these spots are accompanied by an active pulse. A boy of Mr. John Carrol owes his recovery from the small-pox to the loss of fifty ounces of blood, by five bleedings, at a time when

nearly every pock on his arms and legs had a purple appearance. Louis XIV was bled five times in the small-pox, when he was but thirteen years of age, and thereby probably saved from the grave, to the great honour and emolument of the single physician who urged it against the advice of all the other physicians of the court. Dr. Cleghorn mentions a single case of the success of bleeding in the petechial small-pox. His want of equal success afterwards, in similar cases, was probably occasioned by his bleeding too sparingly, that is, but three or four times.

Abscesses and sore breasts, which accompany or succeed fever, are no objections to blood-letting, provided the pulse indicate the continuance of inflammatory diathesis. They depend frequently upon the same state of the system as livid effusions on the skin.

14. The long duration of fever. Inflammatory diathesis is often protracted for many weeks, in the chronic state of fever. It, moreover, frequently revives after having disappeared, from an accidental irritant affecting some part of the body, particularly the lungs and brain. I bled a young man of James Cameron, in the autumn of 1794, four times between the 20th and 30th days of a chronic fever,

in consequence of a pain in the side, accompanied by a tense pulse, which suddenly came on after the 20th day of his disease. His blood was sizy. His pain and tense pulse were subdued by the bleeding, and he recovered. I bled the late Dr. Prowl twelve times, in a fever which continued thirty days, in the autumn of the year 1800. I wish these cases to be attended to by young practitioners. The pulmonary consumption is often the effect of a chronic fever, terminating with fresh inflammatory symptoms, by effusions in the lungs. It may easily be prevented by forgetting the number of the days of our patient's fever, and treating the pulmonary affection as if it were a recent complaint.

15. Tremors and slight convulsions in the limbs. Bark, wine, laudanum, and musk are generally prescribed to remove these symptoms; but, to be effectual, they should, in most cases, be preceded by the loss of a few ounces of blood.

16. Bleeding is forbidden after the fifth or seventh day in a pleurisy. This prohibition was introduced into medicine at a time when a fear was entertained of arresting the progress of nature in preparing and expelling morbific matter from the system. From repeated experience I can assert, that bleeding is safe in every stage of pleurisy in

which there is pain, and a tense and oppressed pulse; and that it has, when used for the first time after the fifth and seventh days, saved many lives. Bleeding has likewise been limited to a certain number of ounces in several states of fever. Were the force of the remote cause of a fever, its degrees of violence, and the habits of the subject of it, always the same, this rule would be a proper one; but, this not being the case, we must be governed wholly by the condition of the system, manifested chiefly by the state of the pulse. To admit of copious bleeding in one state of fever, and not in another, under equal circumstances of morbid excitement, is to prescribe for its name, and to forget the changes which climate, season, and previous habits create in all its different states.

17. The loss of a sufficient quantity of blood is often prevented by patients being apparently *worse*, after the first or second bleeding. This change for the worse, shows itself in some one or more of the following symptoms, viz. increase of heat, chills, delirium, hæmorrhages, convulsions, nausea, vomiting, faintness, coma, great weakness, pain, a tense, after a soft pulse, and a reduction of it in force and frequency. They are all occasioned by the system rising suddenly from a state of extreme depression, in consequence of the abstraction of the

pressure of the blood to a state of vigour and activity, so great, in some instances, as to reproduce a depression below what existed in the system before a vein was opened; or it is occasioned by a translation of morbid action from one part of the body to another.

The chills which follow bleeding are the effects of a change in the fever, from an uncommon to a common state of malignity. They occur chiefly in those violent cases of fever which come on without a chilly fit.

The hæmorrhages produced by bleeding are chiefly from the nose, hæmorrhoidal vessels, or uterus, and of course are, for the most part, safe.

Uncommon weakness, succeeding blood-letting, is the effect of sudden depression induced upon the whole system, by the cause before-mentioned, or of a sudden translation of the excitement of the muscles into the blood-vessels, or some other part of the body. These symptoms, together with all the others which have been mentioned, are so far from forbidding, that they all most forcibly indicate a repetition of blood-letting.

I shall briefly illustrate, by the recital of three cases, the good effects of bleeding, in removing pain, and the preternatural slowness and weakness of the pulse, when produced by the use of that remedy.

In the month of June of 1795, I visited Dr. Say in a malignant fever, attended with pleuritic symptoms, in consultation with Dr. Physick. An acute pain in his head followed six successive bleedings. After a seventh bleeding, he had no pain. His fever soon afterwards left him. In thus persevering in the use of a remedy, which, for several days, appeared to do harm, we were guided wholly by the state of his pulse, which uniformly indicated, by its force, the necessity of more bleeding.

In the autumn of 1794, I was sent for to visit Samuel Bradford, a young man of about 20 years of age, son of Mr. Thomas Bradford, who was ill with the reigning malignant epidemic. His pulse was at 80. I drew about 12 ounces of blood from him. Immediately after his arm was tied up, his pulse fell to 60 strokes in a minute. I bled him a second time, but more plentifully than before, and thereby, in a few minutes, brought his pulse back again to 80 strokes in a minute. A third bleeding

the next day, aided by the usual purging physic, cured him in a few days.

In the month of March, 1795, Dr. Physick requested me to visit, with him, Mrs. Fries, the wife of Mr. John Fries, in a malignant fever. He had bled her four times. After the fourth bleeding, her pulse suddenly fell, so as scarcely to be perceptible. I found her hands and feet cold, and her countenance ghastly, as if she were in the last moments of life. In this alarming situation, I suggested nothing to Dr. Physick but to follow his judgment, for I knew that he was master of that law of the animal economy which resolved all her symptoms into an oppressed state of the system. The doctor decided in a moment in favour of more bleeding. During the flowing of the blood, the pulse rose. At the end of three, ten, and seventeen hours it fell, and rose again by three successive bleedings, in all of which she lost about thirty ounces of *sizy* blood. So great was the vigour acquired by the pulse, a few days after the paroxysms of depression, which have been described, were relieved, that it required seven more bleedings to subdue it. I wish the history of these two cases to be carefully attended to by the reader. I have been thus minute in the detail of them, chiefly because I have heard of practitioners who have lost

patients by attempting to raise a pulse that had been depressed by bleeding, in a malignant fever, by means of cordial medicines, instead of the repeated use of the lancet. The practice is strictly rational; for, in proportion as the blood-vessels are weakened by pressure, the quantity of blood to be moved should be proportioned to the diminution of their strength.

This depressed state of the pulse, whether induced by a paroxysm of fever, or by blood-letting, is sometimes attended with a strong pulsation of the arteries in the bowels and head.

I have mentioned, among the *apparent* bad effects of bleeding, that it sometimes changes a soft into a tense pulse. Of this I saw a remarkable instance in Captain John Barry, in the autumn of 1795. After the loss of 130 ounces of blood in a malignant yellow fever, his pulse became so soft as to indicate no more bleeding. In this situation he remained for three days, but without mending as rapidly as I expected from the state of his pulse. On the fourth day he had a hæmorrhage from his bowels, from which he lost above a pint of blood. His pulse now suddenly became tense, and continued so for two or three days. I ascribed this change in his pulse to the vessels of the bowels,

which had been oppressed by congestion, being so much relieved by the hæmorrhage, as to resume an inflammatory action. I have observed a similar change to take place in the pulse, after a third bleeding, in a case of hæmorrhoidal fever, which came under my notice in the month of January, 1803. It is thus we see the blood-vessels, in a common phlegmon, travel back again, from a tendency to mortification, to the red colour and pain of common inflammation.

From a review of the commotions excited in the system by bleeding, a reason may be given why the physicians, who do not bleed in the depressed state of the pulse, have so few patients in what they call malignant fevers, compared with those who use a contrary practice. The disease, in such cases, being locked up, is not permitted to unfold its true character; and hence patients are said to die of apoplexy, lethargy, cholera, dysentery, or nervous fever, who, under a different treatment, would have exhibited all the marks of an ordinary malignant fever.

In obviating the objections to blood-letting from its apparent evils, I have said nothing of the apparent bad effects of other remedies. A nausea is often rendered worse by an emetic, and pains in the

bowels are increased by a purge. But these remedies notwithstanding maintain, and justly too, a high character among physicians.

19. Bleeding has been accused of bringing on a nervous, or the chronic state of fever. The use of this remedy, in a degree so moderate as to obviate the putrid or gangrenous state of fever only, may induce the chronic state of fever; for it is the effect, in this case, of the remains of inflammatory diathesis in the blood-vessels; but when blood is drawn proportioned to the morbid action in the system, it is impossible for a chronic fever to be produced by it. Even the excessive use of blood-letting, however injurious it may be in other respects, cannot produce a chronic fever, for it destroys morbid action altogether in the blood-vessels.

20. Bleeding has been charged with being a weakening remedy. I grant that it is so, and in this, its merit chiefly consists. The excessive morbid action of the blood-vessels must be subdued in part, in a fever, before stimulating remedies can be given with safety or advantage. Now this is usually attempted by depleting medicines, to be mentioned hereafter, or it is left to time and nature, all of which are frequently either deficient, or excessive in their operations; whereas bleeding, by sud-

denly reducing the morbid action of the blood-vessels to a wished-for point of debility, saves a great and unnecessary waste of excitability, and thus prepares the body for the exhibition of such cordial remedies as are proper to remove the debility which predisposed to the fever.

21. It has been said that bleeding renders the habitual use of it necessary to health and life. This objection to blood-letting is founded upon an ignorance of the difference between the healthy, and morbid action of the blood-vessels. Where blood is drawn in health, such a relaxation is induced in the blood-vessels, as to favour the formation of plethora, which may require habitual bleeding to remove it; but where blood is drawn only in the inflammatory state of fever, the blood-vessels are reduced from a morbid degree of strength to that which is natural, in which state no predisposition to plethora is created, and no foundation laid for periodical blood-letting. But there are cases which require even this evil, to prevent a greater. Thus we cure a strangulated hernia, when no fever attends, by the most profuse bleeding. The plethora and predisposition to disease which follow it are trifling, compared with preventing certain and sudden death.

22. Bleeding has been accused of bringing on an intermitting fever. This is so far from being an objection to it, that it should be considered as a new argument in its favour; for when it produces that state of fever, it converts a latent, and perhaps a dangerous disease, into one that is obvious to the senses, and under the dominion of medicine. Nor is it an objection to blood-letting, that, when used in an inflammatory intermittent, it sometimes changes it into a continual fever. An instance of the good effects of this change occurred in the Pennsylvania hospital, in an obstinate tertian, in the year 1804. The continual fever, which followed the loss of blood, was cured in a few days, and by the most simple remedies.

23. It has been said that bleeding, more especially where it is copious, predisposes to effusions of serum in the lungs, chest, bowels, limbs, and brain. In replying to this objection to bleeding, in my public lectures, I have addressed my pupils in the following language: "Ask the poor patients who come panting to the door of our hospital, with swelled legs and hard bellies, every fall, whether they have been too copiously bled, and they will all tell you, that no lancet has come near their arms. Ask the parents who still mourn the loss of children who have died, in our city, of the internal dropsy

of the brain, whether they were destroyed by excessive blood-letting? If the remembrance of the acute sufferings which accompanied their sickness and death will permit these parents to speak, they will tell you, that every medicine, except bleeding, had been tried to no purpose in their children's diseases. Go to those families in which I have practised for many years, and inquire, whether there is a living or a dead instance of dropsy having followed, in any one of them, the use of my lancet? Let the undertakers and grave-diggers bear witness against me, if I have ever, in the course of my practice, conveyed the body of a single dropsical patient into their hands, by excessive blood-letting? No. Dropsies, like abscesses and gangrenous eruptions upon the skin, arise, in most cases, from the *want* of sufficient bleeding in inflammatory diseases. Debility, whether induced by action or abstraction, seldom disposes to effusion. Who ever heard of dropsy succeeding famine? And how rarely do we see it accompany the extreme debility of old age?"

"If ever bleeding kills," says Botallus, either directly or indirectly, through the instrumentality of other diseases, "it is not from its excess, but because it is not drawn in a sufficient quantity, or

at a proper time*." And, again, says this excellent writer, "One hundred thousand men perish from the want of blood-letting, or from its being used out of time, to one who perishes from too much bleeding, prescribed by a physician†."

It is remarkable, that the dread of producing a dropsy by bleeding, is confined chiefly to its use in malignant fevers; for the men who urge this objection to it, do not hesitate to draw four or five quarts of blood in the cure of the pleurisy. The habitual association of the lancet with this disease, has often caused me to rejoice when I have heard a patient complain of a pain in his side, in a malignant fever. It insured to me his consent to the frequent use of the lancet, and it protected me, when it was used unsuccessfully, from the clamours of the public, for few people censure copious bleeding in a pleurisy.

24. Against blood-letting it has been urged, that the Indians of our country cure their inflammatory fevers without it. To relieve myself from the distressing obloquy to which my use of this remedy formerly exposed me, I have carefully sought for,

* Cap. viii. § 4.

† Cap. xxxvi. § 4.

and examined their remedies for those fevers, with a sincere desire to adopt them; but my inquiries have convinced me, that they are not only disproportioned to the habits and diseases of civilized life, but that they are far less successful than blood-letting, in curing the inflammatory fevers which occur among the Indians themselves.

25. Evacuating remedies of another kind have been said to be more safe than bleeding, and equally effectual, in reducing the inflammatory state of fever. I shall enumerate each of these evacuating remedies, and then draw a comparative view of their effects with blood-letting. They are,

I. Vomits.

II. Purges.

III. Sweats.

IV. Salivation. And,

V. Blisters.

I. Vomits have often been effectual in curing fevers of a mild character. They discharge offensive and irritating matters from the stomach; they

lessen the fulness of the blood-vessels, by determining the serum of the blood through the pores; and they equalize the excitement of the system, by inviting its excessive degrees from the blood-vessels to the stomach and muscles. But they are,

1. Uncertain in their operation, from the torpor induced by the fever upon the stomach.

2. They are unsafe in many conditions of the system, as in pregnancy, and a disposition to apoplexy and ruptures. Life has sometimes been destroyed by their inducing cramp, hæmorrhage, and inflammation in the stomach.

3. They are not subject to the controul of a physician, often operating more, or less than was intended by him, or indicated by the disease.

4. They are often ineffectual in mild, and always so in fevers of great morbid action.

II. Purges are useful in discharging acrid fæces and bile from the bowels in fevers. They act, moreover, by creating an artificial weak part, and thus invite morbid excitement from the blood-vessels to the bowels. They likewise lessen the quan-

tity of blood, by preventing fresh accessions of chyle being added to it; but like vomits they are,

1. Uncertain in their operation; and from the same cause. Many ounces of salts and castor oil, and whole drachms of calomel and jalap, have often been given, without effect, to remove the costiveness which is connected with the malignant state of fever.

2. They are not subject to the direction of a physician, with respect to the time of their operation, or the quantity or quality of matter they are intended to discharge from the bowels.

3. They are unsafe in the advanced stage of fevers. Dr. Physick informed me, that three patients died in the water-closet, under the operation of purges, in St. George's hospital, during his attendance upon it. I have seen death, in several instances, succeed a plentiful spontaneous stool in debilitated habits.

III. Sweating was introduced into practice at a time when morbific matter was supposed to be the proximate cause of fever. It acts, not by expelling any thing exclusively morbid from the blood, but

by abstracting a portion of its fluid parts, and thus reducing the action of the blood-vessels. This mode of curing fever is still fashionable in genteel life. It excites no fear, and offends no sense. The sweating remedies have been numerous, and fashion has reigned as much among them, as in other things. Alexipharmic waters, and powders, and all the train of sudorific medicines, have lately yielded to the different preparations of antimony, particularly to James's powder. I object to them all,

1. Because they are uncertain; large and repeated doses of them being often given to no purpose.

2. Because they are slow, and disagreeable, where they succeed in curing fever.

3. Because, like vomits and purges, they are not under the direction of a physician, with respect to the quantity of fluid discharged by them.

4. Because they are sometimes, even when most profuse, ineffectual in the cure of fever.

5. The preparations of antimony, lately employed for the purpose of exciting sweats, are by no

means safe. They sometimes convulse the system by a violent puking. Even the boasted James's powder has done great mischief. Dr. Goldsmith and Mr. Howard, it is said, were destroyed by it.

None of these objections to sweating remedies are intended to dissuade from their use, when nature shows a disposition to throw off a fever by the pores of the skin; but, even then, they often require the aid of bleeding to render them effectual for that purpose.

IV. Mercury, the Sampson of the materia medica, after having subdued the venereal disease, the tetanus, and many other formidable diseases, has lately added to its triumphs and reputation, by overcoming the inflammatory and malignant state of fever. I shall confine myself, in this place, to its depleting operation, when it acts by exciting a salivation. From half a pound to two pounds of fluid are discharged by it in a day. The depletion in this way is gradual, whereby fainting is prevented. By exciting and inflaming the glands of the mouth and throat, excitement and inflammation are abstracted from more vital parts. In morbid congestion and excitement in the brain, a salivation is of eminent service, from the proximity of the dis-

charge to the part affected. But I object to it, as an exclusive evacuant in the cure of fever,

1. Because it is sometimes impossible, by the largest doses of mercury, to excite it, when the exigences of the system render it most necessary.

2. Because it is not so quick in its operation, as to be proportioned to the rapid progress of the malignant state of fever.

3. Because it is at all times a disagreeable, and frequently a painful remedy, more especially where the teeth are decayed.

4. Because it cannot be proportioned in its duration, or in the quantity of fluid discharged by it, to the violence or changes in the fever.

Dr. Chisholm relied, for the cure of the Beullam fever at Grenada, chiefly upon this evacuation. I have mentioned the ratio of success which attended it.

V. Blisters are useful in depleting from those parts which are the seats of topical inflammation. The relief obtained by them in this way more than balances their stimulus upon the whole system.

need hardly say, that their effects in reducing the morbid and excessive action of the blood-vessels are very feeble. To depend upon them in cases of great inflammatory action, is as unwise as it would be to attempt to bale the water from a leaky and sinking ship by the hollow of the hand, instead of discharging it by two or three pumps.

VI. Abstemious diet has sometimes been prescribed as a remedy for fever. It acts directly by the abstraction of the stimulus of food from the stomach, and indirectly by lessening the quantity of blood. It can bear no proportion, in its effects, to the rapidity and violence of an inflammatory fever. In chronic fever, such as occurs in the pulmonary consumption, it has often been tried to no purpose. Long before it reduces the pulse, it often induces such a relaxation of the tone of the stomach and bowels as to accelerate death. To depend upon it therefore in the cure of inflammatory fever, whether acute or chronic, is like trusting to the rays of the sun to exhale the water of an overflowing tide, instead of draining it off immediately, by digging a hole in the ground. But there are cases in which the blood-vessels become so insolated, that they refuse to yield their morbid excitement to depletion from any outlet, except from themselves. I attended a sailor, in the Pennsylvania hospital, in 1799, who

was affected with deafness, attended with a full and tense pulse. I prescribed for it, purging, blisters, and low diet, but without any effect. Perceiving no change in his pulse, nor in his disease, from those remedies, I ordered him to lose ten ounces of blood. The relief obtained by this evacuation induced me to repeat it. By means of six bleedings he was perfectly cured, without the aid of any other remedy.

Bleeding has great advantages over every mode of depleting that has been mentioned.

1. It abstracts one of the exciting causes, viz. the stimulus of the blood, from the seat of fever. I have formerly illustrated this advantage of blood-letting, by comparing it to the abstraction of a grain of sand from the eye to cure an opthalmia. The other depleting remedies are as indirect and circuitous in their operation in curing fever, as vomits and purges would be to remove an inflammation in the eye, while the grain of sand continued to irritate it.

2. Blood-letting is quick in its operation, and may be accommodated to the rapidity of fever, when it manifests itself in apoplexy, palsy, and syncope.

3. It is under the command of a physician. He may bleed *when* and *where* he pleases, and may suit the *quantity* of blood he draws, exactly to the condition of his patient's system.

4. It may be performed with the least attendance of nurses or friends. This is of great importance to the poor at all times, and to the rich during the prevalence of mortal epidemics.

5. It disturbs the system much less than any of the other modes of depleting, and therefore is best accommodated to that state of the system, in which patients are in danger of fainting or dying upon being moved.

6. It is a more delicate depleting remedy than most of those which have been mentioned, particularly vomits, purges, and a salivation.

7. There is no immediate danger to life from its use. Patients have sometimes died under the operation of vomits and purges, but I never saw nor heard an instance of a patient's dying in a fainty fit, brought on by bleeding.

8. It is less weakening, when used to the extent that is necessary to cure, than the same degrees of vomiting, purging, and sweating.

9. Convalescence is more rapid and more perfect after bleeding, than after the successful use of any of the other evacuating remedies.

By making use of blood-letting in fevers, we are not precluded from the benefits of the other evacuating remedies. Some of them are rendered more certain and more effectual by it, and there are cases of fever, in which the combined or successive application of them all is barely sufficient to save life.

To rely upon any one evacuating remedy, to the exclusion of the others, is like trusting to a pair of oars in a sea voyage, instead of spreading every sail of a ship.

I suspect the disputes about the eligibility of the different remedies which have been mentioned, have arisen from an ignorance that they all belong to one class, and that they differ only in their force and manner of operation. Thus the physicians of the last century ascribed different virtues to salts of different names, which the chemists of the present day have taught us are exactly the same, and differ only in the manner of their being prepared.

Having replied to the principal objections to blood-letting, and stated its comparative advantages

over other modes of depletion, I proceed next to mention the circumstances which should regulate the use of it. These are,

I. The state of the pulse.

The following states of the pulse indicate the necessity of bleeding.

1. A full, frequent, and tense pulse, such as occurs in the pulmonary, rheumatic, gouty, phrenitic, and maniacal states of fever.

2. A full, frequent, and jerking pulse, without tension, such as frequently occurs in the vertiginous, paralytic, apoplectic, and hydropic states of fever.

3. A small, frequent, but tense pulse, such as occurs in the chronic, pulmonary, and rheumatic states of fever.

4. A tense and *quick* pulse, without much preternatural frequency. This state of the pulse is common in the yellow fever.

5. A slow but tense pulse, such as occurs in the apoplectic, hydrocephalic, and malignant states of

fever, in which its strokes are from 60 to 9, in a minute.

6. An uncommonly frequent pulse, without much tension, beating from 120 to 170 or 180 strokes in a minute. This state of the pulse occurs likewise in the malignant states of fever.

7. A soft pulse, without much frequency or fulness. I have met with this state of the pulse in affections of the brain, and in that state of pulmonary fever which is known by the name of pneumonia notha. It sometimes, I have remarked, becomes tense after bleeding.

8. An intermitting pulse.

9. A depressed pulse.

10. An imperceptible pulse. The slow, intermitting, depressed, and imperceptible states of the pulse are supposed exclusively to indicate congestion in the brain. But they are all, I believe, occasioned likewise by great excess of stimulus acting upon the heart and arteries. A pulse more tense in one arm than in the other, I have generally found to attend a morbid state of the brain. Much yet remains to be known of the signs of a disease in the

brain, by the states of the pulse; hence Mr. Hunter has justly remarked, that "In inflammation of the brain, the pulse varies more than in inflammations of any other part; and perhaps we are led to judge of inflammation there, more from *other* symptoms than the pulse*."

The slow, uncommonly frequent, intermitting, and imperceptible states of the pulse, which require bleeding, may be distinguished from the same states of the pulse, which arise from an exhausted state of the system, and that forbid bleeding, by the following marks:

1. They occur in the beginning of a fever.

2. They occur in the paroxysms of fevers which have remissions and exacerbations.

3. They sometimes occur after blood-letting, from causes formerly mentioned.

4. They sometimes occur, and continue during the whole course of an inflammation of the stomach and bowels. And,

* Treatise on Inflammation, chap. iii. 9.

5. They occur in relapses, after the crisis of a fever.

The other states of the pulse indicate bleeding in every stage of fever, and in every condition of the system. I have taken notice, in another place, of the circumstances which render it proper in the advanced stage of chronic fever.

If all the states of pulse which have been enumerated indicate bleeding, it must be an affecting consideration to reflect, how many lives have been lost, by physicians limiting the use of the lancet only to the tense or full pulse!

I wish it comported with the proposed limits of this essay to illustrate and establish, by the recital of cases, the truth of these remarks upon the indications of bleeding from the pulse. It communicates much more knowledge of the state of the system than any other sign of disease. Its frequency (unconnected with its other states), being under the influence of diet, motion, and the passions of the mind, is of the least consequence. In counting the number of its strokes, we are apt to be diverted from attending to its irregularity and force; and in these, it should always be remembered, fever chiefly consists. The knowledge ac-

quired by attending to these states of the pulse is so definite and useful, and the circumstances which seduce from a due attention to them are so erroneous in their indications, that I have sometimes wished the Chinese custom of prescribing, from feeling the pulse only, without seeing or conversing with the patient, were imposed upon all physicians.

To render the knowledge of the indications of blood-letting, from the state of the pulse, as definite and correct as possible, I shall add, for the benefit of young practitioners, the following directions for feeling it.

1. Let the arm be placed in a situation in which all the muscles which move it shall be completely relaxed; and let it, at the same time, be free from the pressure of the body upon it.

2. Feel the pulse, in all obscure or difficult cases, in both arms.

3. Apply all the fingers of one hand, when practicable, to the pulse. For this purpose, it will be most convenient to feel the pulse of the right hand with your left, and of the left hand with your right.

4. Do not decide upon blood-letting, in difficult cases, until you have felt the pulse for some time. The Chinese physicians never prescribe until they have counted 49 strokes.

5. Feel the pulse at the intervals of four or five minutes, when you suspect that its force has been varied by any circumstance not connected with the disease, such as emotions of the mind, exercise, eating, drinking, and the like.

6. Feel the pulsations of the arteries in the temples and in the neck, when the pulse is depressed or imperceptible in the wrists.

7. Request silence in a sick room, and close your eyes, in feeling a pulse in difficult cases. By so doing, you will concentrate the sensations of your ears and eyes, in your fingers.

In judging of the states of the pulse which have been enumerated, it will be necessary always to remember the natural difference, in its frequency and force, in old people and children; also in the morning and evening, and in the sleeping and waking states of the system.

Much yet remains to be known upon this subject. I have mentioned the different states of the pulse, which call for bleeding, but it is more difficult to know when to prescribe it, when the pulse imparts no sign of disease. In general it may be remarked, where the disease is *recent*, the part affected important to life, and incapable of sustaining violent morbid action long, without danger of disorganization, where pain is great, and respiration difficult, the pulse may be disregarded in the use of the lancet.

But to return.

II. Regard should be had to the character of the reigning epidemic, in deciding upon blood-letting. If the prevailing fever be of a highly inflammatory nature, bleeding may be used with more safety, in cases where the indications of it from the pulse are somewhat doubtful. The character of a previous epidemic should likewise direct the use of the lancet. The pestilential fever which followed the plague in London, in 1665, Dr. Sydenham says, yielded only to blood-letting. It is equally necessary in all the febrile diseases which succeed malignant fevers.

III. Regard should be had to the weather and season of the year. Dr. Hillary and Dr. Huxham both say it is much more necessary in dry, than in wet weather, and, all physicians know, it is more copiously indicated in the spring and autumn, than in summer and winter.

IV. The constitution of a patient, and more especially his habits with respect to blood-letting, should be taken into consideration, in prescribing it. If he be plethoric, and accustomed to bleeding in former indispositions, it will be more necessary, than in opposite states and habits of the system. Nature will expect it.

V. The corpulency of a patient should regulate the use of the lancet. A butcher of great observation informed me, that a fat ox did not yield more than from one half, to one third of the quantity of blood of a lean one, of the same size of bone, and it is well known, that the loss of a small quantity of blood, after cutting off the head of a fowl, is always a sign of its being fit for the table. The pressure of fat upon the blood-vessels produces the same effects in the human species that it does in those animals; of course, less blood should be drawn from fat, than from lean people, under equal circumstances of disease.

VI. As persons have more or less blood in their vessels, according to their size, less blood should be drawn, under equal circumstances, from small than large people.

VII. Regard should be had to the age of adults in prescribing bleeding. In persons between fifty and sixty years of age, for reasons formerly mentioned, more blood may be drawn than in middle life, in similar diseases. In persons beyond 70, it will be necessary to regulate the quantity to be drawn by other signs than the pulse, or the appearances of the blood, the former being generally full, and sometimes tense, and the latter often putting on the sign of the second grade of morbid action formerly described.

VIII. Regard should be had to the country or place from which persons affected with fevers have arrived, in prescribing the loss of blood. Fevers, in America, are more inflammatory than fevers, in persons of equal rank, in Great-Britain. A French physician once said, it was safer to draw a hogshead of wine from a Frenchman's veins, than a quarter of a hundred pounds of beef from an Englishman's, meaning to convey an idea of the difference in the grades of morbid or inflammatory action in the diseases of the inhabitants of France and

England, and of the difference in the quantity of blood proper to be drawn in each of them. A similar difference exists between the grades of fever in Great-Britain and America. From a want of attention to this circumstance, I saw a common pleurisy end in an abscess of the lungs, in a sea captain, in the city of London, in the year 1769, who was attended by a physician of the first reputation in England. He was bled but once. His pulse and American constitution called for the loss of 50 or 60 ounces of blood.

IX. Regard should be had to the structure and situation of the parts diseased with febrile action. The brain, from its importance to all the functions of life, the rectum, the bladder, and the trachea, when inflamed, and the intestines, when strangulated, from their being removed so much out of the influence of the great circulation, all require more copious bleeding than the same degrees of disease in the lungs, and some other parts of the body.

X. After blood-letting has been performed, the appearances of the blood should be attended to, in order to judge of the propriety of repeating it. I shall briefly describe these appearances, and arrange them in the order in which they indicate the

different degrees of inflammatory diathesis, beginning with the highest.

1. Dissolved blood. It occurs in the malignant states of fever. I have seen it several times in the pleurisy, and have once heard of it in a case of gout. I have ascribed this decomposition of the blood to such a violent degree of action in the blood-vessels, as to dispose them to a paralytic state. It is generally considered as a signal to lay aside the lancet. If it occur in the *first stage* of a fever, it indicates a very opposite practice. By repeated bleedings, the vessels recover their natural action, and the blood becomes *reduced* to its original texture. Of this I have had frequent experience, since the year 1793. It required three successive bleedings to restore the blood from a dissolved, to a coagulable state, in Mr. Benton. It afterwards became very sizy. If this dissolved blood appear towards the close of a malignant fever, no other benefit than the protraction of life for a day or two, or an easy death, can be expected from repeating the bleeding, even though it be indicated by a tense pulse; for the viscera are generally so much choaked by the continuance of violent action in the blood-vessels, that they are seldom able to discharge the blood which distends them, into the cavity in the vessels, which is created by the ab-

straction of blood from a vein. There is some variety in the appearance of this state of the blood, which indicates more or less violent pressure upon the blood-vessels. It threatens most danger to life when it resembles molasses in its consistence. The danger is less when the part which is dissolved occupies the bottom of the bowl, and when its surface is covered with a sizy pellicle or coat.

Does not the restoration of the blood from its disorganized state, by means of bleeding, suggest an idea of a similar change being practicable in the solids, when they are disorganized by disease? And are we not led hereby to an animating view of the extent and power of medicine?

2. Blood of a scarlet colour, without any separation into crassamentum or serum, indicates a second degree of morbid action. It occurs likewise in the malignant state of fever. It is called improperly dense blood. It occurs in old people.

3. Blood in which part of the crassamentum is dissolved in the serum, forming a resemblance to what is called the lotura carnium, or the washings of flesh in water.

4. Crassamentum sinking to the bottom of a bowl in yellow serum.

5. Crassamentum floating in serum, which is at first turbid, but which afterwards becomes yellow and transparent, by depositing certain red and fiery particles of the blood in the bottom of the bowl.

6. Sizy blood, or blood covered with a buffy coat. The more the crassamentum appears in the form of a cup, the more inflammatory action is said to be indicated by it. This appearance of the blood occurs in all the common states of inflammatory fever. It occurs too in the mild state of malignant fevers, and in the close of such of them as have been violent. It is not always confined to the common inflammatory state of the pulse, for I have observed it occasionally in most of the different states of the pulse which have been described. The appearance of this buffy coat on the blood in the yellow fever is always favourable. It shows the disease to be tending from an uncommon to a *common* degree of inflammatory diathesis. It has been remarked, that blood which resembles claret in its colour, while flowing, generally puts on, when it cools, a sizy appearance.

It would seem, from these facts, that the power of coagulation in the blood was lessened in an exact ratio to the increase of action upon the blood-vessels, and that it was increased in proportion to the diminution of that action, to that degree of it which constitutes what I have called *common* inflammatory action.

Here, as upon a former occasion, we may say with concern, if bleeding be indicated by all the appearances of the blood which have been enumerated, how many lives have been lost by physicians limiting the use of the lancet to those cases only, where the blood discovered an inflammatory crust!

These remarks upon the relative signs of inflammatory action in the blood-vessels, should be admitted with a recollection that they are all liable to be varied by a moderate, or violent exacerbation of fever, by the size of the stream of blood, and by the heat, coldness, and form of the cup into which the blood flows. Even blood drawn, under exactly equal circumstances, from both arms, exhibited, in a case of pleurisy communicated to me by Dr. Mitchell, of Kentucky, very different appearances. That which was taken from one arm was sizy, while that which was taken from the other was of a scarlet colour. That which is drawn from a vein

in the arm, puts on, likewise, appearances very different from that which is discharged from the bowels, in a dysentery. These facts were alluded to in the Outlines of the Theory of Fever*, in order to prove that unequal excitement takes place, not only in the different systems of the body, but in the same system, particularly in the blood-vessels. They likewise show us the necessity of attending to the state of the *pulse* in both arms, as well as in other parts of the body, in prescribing blood-letting. When time, and more attention to that index of the state of the system in fevers, shall have brought to light all the knowledge that the pulse is capable of imparting, the appearances of the blood, in fevers, will be regarded as little as the appearances of the urine.

XI. Blood-letting should always be copious where there is danger from sudden and great congestion or inflammation, in vital parts. This danger is indicated most commonly by pain; but there may be congestion in the lungs, liver, bowels, and even in the head, without pain. In these cases, the state of the pulse should always govern the use of the lancet.

* Vol. iii.

XII. What quantity of blood may be taken, with safety, from a patient in an inflammatory fever? To answer this question it will be necessary to remark, 1. That, in a person of an ordinary size, there are supposed to be contained between 25 and 28 pounds of blood; and 2. That much more blood may be taken when the blood-vessels are in a state of morbid excitement and excitability, than at any other time. One of the uses of the blood is to stimulate the blood-vessels, and thereby to assist in originating and preserving animal life. In a healthy state of the vessels, the whole mass of the blood is necessary for this purpose; but in their state of morbid excitability, a much less quantity of blood than what is natural (perhaps in some cases four or five pounds) are sufficient to keep up an equal and vigorous circulation. Thus very small portions of light and sound are sufficient to excite vision and hearing in an inflamed, and highly excitable state of the eyes and ears. Thus too, a single glass of wine will often produce delirium in a fever in a man, who, when in health, is in the habit of drinking a bottle every day, without having his pulse quickened by it.

An ignorance of the quantity of blood which has been drawn by design, or lost by accident, has contributed very much to encourage prejudices against

blood-letting. Mr. Cline drew 320 ounces of blood in 20 days from a patient in St. Thomas's hospital, who laboured under a contusion of the head. But this quantity is small compared with the quantity lost by a number of persons, whose cases are recorded by Dr. Haller*. I shall mention a few of them. One person lost 9 pounds of blood, a second 12, a third 18, and a fourth 22, from the nose, at one time. A fifth lost 12 pounds by vomiting in one night, and a sixth 22 from the lungs. A gentleman at Angola lost between 3 and 4 pounds daily from his nose. To cure it, he was bled 97 times in one year. A young woman was bled 1020 times in 19 years, to cure her of plethora which disposed her to hysteria. Another young woman lost 125 ounces of blood, by a natural hæmorrhage, every month. To cure it, she was bled every day, and every other day, for 14 months. In none of these instances, was death the consequence of these great evacuations of blood. On the contrary, all the persons alluded to, recovered. Many similar instances of the safety, and even benefit of profuse discharges of blood, by nature and art, might be mentioned from other authors. I shall insert only one more, which shall be taken from Dr. Sydenham's account of the cure of the plague. "Among

* Elementa Physiologiæ, vol. iv. p. 45.

the other calamities of the civil war which afflicted this nation, the plague also raged in several places, and was brought by accident from another place to Dunstar Castle, in Somersetshire, where some of the soldiers dying suddenly, with an eruption of spots, it likewise seized several others. It happened at that time that a surgeon, who had travelled much in foreign parts, was in the service there, and applied to the governor for leave to assist his fellow-soldiers who were afflicted with this dreadful disease, in the best manner he was able; which being granted, he took so large a quantity of blood from every one at the beginning of the disease, and before any swelling was perceived, that they were ready to faint, and drop down, for he bled them all standing, and in the open air, and had no vessel to measure the blood, which falling on the ground, the quantity each person lost could not, of course, be known. The operation being over, he ordered them to lie in their tents; and though he gave no kind of remedy after bleeding, yet of the numbers that were thus treated, not a single person died. I had this relation from Colonel Francis Windham, a gentleman of great honour and veracity, and at this time governor of the castle*."

* Vol. i. p. 131.

Again. An ignorance of the rapid manner in which blood is regenerated, when lost or drawn, has helped to keep up prejudices against blood-letting. A person (Dr. Haller says) lost five pounds of blood daily from the hæmorrhoidal vessels for 62 days, and another 75 pounds of blood in 10 days. The loss each day was supplied by fresh quantities of aliment.

These facts, I hope, will be sufficient to establish the safety and advantages of plentiful blood-letting, in cases of violent fever; also to show the fallacy and danger of that practice which attempts the cure of such cases of fever, by what is called *moderate* bleeding. There are, it has been said, no half truths in government. It is equally true, that there are no half truths in medicine. This half-way practice of moderate bleeding, has kept up the mortality of pestilential fevers, in all ages, and in all countries. I have combated this practice elsewhere*, and have asserted, upon the authority of Dr. Sydenham, that it is much better not to bleed at all, than to draw blood disproportioned in quantity to the violence of the fever. If the state of the pulse be

* Account of the Yellow Fever in 1793.

our guide, the continuance of its inflammatory action, after the loss of even 100 ounces of blood, indicates the necessity of more bleeding, as much as it did the first time a vein was opened. In the use of this remedy it may be truly said, as in many of the enterprizes of life, that nothing is done, while any thing remains to be done. Bleeding should be repeated while the symptoms which first indicated it continue, should it be until four-fifths of the blood contained in the body are drawn away. In this manner we act in the use of other remedies. Who ever leaves off giving purges in a colic, attended with costiveness, before the bowels are opened? or who lays aside mercury as a useless medicine, because a few doses of it do not cure the venereal disease?

I shall only add under this head, that I have always observed the cure of a malignant fever to be most complete, and the convalescence to be most rapid, when the bleeding has been continued until a *paleness* is induced in the face, and until the patient is able to sit up without being fainty. After these circumstances occur, a moderate degree of force in the pulse will gradually wear itself away, without doing any harm.

XIII. In drawing blood, the quantity should be large or small at a time, according to the state of the system. In cases where the pulse acts with force and freedom, from 10 to 20 ounces of blood may be taken at once; but in cases where the pulse is much depressed, it will be better to take away but a few ounces at a time, and to repeat it three or four times a day. By this means the blood-vessels more *gradually* recover their vigour, and the apparent bad effects of bleeding are thereby prevented. Perhaps the same advantages might be derived, in many other cases, from the gradual abstraction of stimuli, that are derived from the gradual increase of their force and number, in their application to the body. For a number of facts in support of this practice, the reader is referred to the history of the yellow fever, in the year 1793. In an inflammatory fever, the character of which is not accurately known, it is safest to begin with moderate bleeding, and to increase it in quantity, according as the violence and duration of the disease shall make it necessary. In fevers, and other diseases, which run their courses in a few days or hours, and which threaten immediate dissolution, there can be no limits fixed to the quantity of blood which may be drawn at once, or in a short time. Botallus drew three, four, and five pints in a day,

in such cases. Dr. Jackson drew fifty-six ounces of blood, at one time, from a Mr. Thompson, of the British hospitals, in a fever of great violence and danger. This patient was instantly relieved from what he styled "chains and horrors." In three or four hours he was out of danger, and in four days, the doctor adds, returned to his duty*. Dr. Physick drew ninety ounces, by weight, from Dr. Dewees, in a sudden attack of the apoplectic state of fever, at one bleeding, and thereby restored him so speedily to health, that he was able to attend to his business in three days afterwards. In chronic states of fever, of an inflammatory type, small and frequent bleedings, are to be preferred to large ones. We use mercury, antimony, and diet drinks as alteratives in many diseases with advantage. We do not expect to remove debility by two or three immersions in a cold bath. We persist with patience in prescribing all the above remedies for months and years, before we expect to reap the full benefits of them. Why should not blood-letting be used in the same way, and have the same chance of doing good? I have long ago adopted this *alterative* mode of using it, and I can

* Remarks on the Constitution of the Medical Department of the British Army.

now look around me, and with pleasure behold a number of persons of both sexes who owe their lives to it. In many cases I have prescribed it once in two or three months, for several years, and in some I have advised it every two weeks, for several months.

There is a state of fever in which an excess in the action of the blood-vessels is barely perceptible, but which often threatens immediate danger to life, by a determination of blood to a vital part. In this case I have frequently seen the scale turn in favour of life, by the loss of but four or five ounces of blood. The pressure of this, and even of a much less quantity of blood in the close of a fever, I believe, as effectually destroys life as the excess of several pounds does in its beginning.

In cases where bleeding does not cure, it may be used with advantage as a *palliative* remedy. Many diseases induce death in a full and highly excited state of the system. Here opium does harm, while bleeding affords certain relief. It belongs to this remedy, in such cases, to ease pain, to prevent convulsions, to compose the mind, to protract the use of reason, to induce sleep, and thus to smooth the passage out of life.

XIV. Bleeding from an artery, commonly called arteriotomy, would probably have many advantages over venesection, could it be performed at all times with ease and safety. Blood discharged by hæmorrhages affords more relief, in fevers, than an equal quantity drawn from a vein, chiefly because it is poured forth, in the former case, from a ruptured artery. I mentioned formerly, that Dr. Mitchell had found blood drawn from an artery to be what is called dense, at a time when that which was drawn from a vein, in the same persons, was dissolved. This fact may possibly admit of some application. In the close of malignant fevers, where bleeding has been omitted in the beginning of the disease, blood drawn from a vein is generally so dissolved, as to be beyond the reach of repeated bleedings to restore it to its natural texture. In this case, arteriotomy might probably be performed with advantage. The arteries, which retain their capacity of life longer than the veins, by being relieved from the immediate pressure of blood upon them, might be enabled so to act upon the torpid veins, as to restore their natural action, and thereby to arrest departing life. Arteriotomy might further be used with advantage in children, in whom it is difficult, and sometimes impracticable to open a vein.

XV. Much has been said about the proper place from whence blood should be drawn. Bleeding in the foot was much used formerly, in order to excite a revulsion from the head and breast; but our present ideas of the circulation of the blood have taught us, that it may be drawn from the arm with equal advantage in nearly all cases. To bleeding in the foot there are the following objections: 1. The difficulty of placing a patient in a situation favourable to it. 2. The greater danger of wounding a tendon in the foot than in the arm, And, 3. The impossibility of examining the blood after it is drawn; for, in this mode of bleeding, the blood generally flows into a bason or pail of water.

Under this head I shall decide upon the method of drawing blood by means of cups and leeches, in the inflammatory state of fever. Where an inflammatory fever arises from local affection, or from contusion in the head or breast, or from a morbid excitement in those, above other parts of the arterial system, they may be useful; but where local affection is a symptom of general and equable fever only, it can seldom be necessary, except where bleeding from the arm has been omitted, or used too sparingly, in the beginning of a fever; by which means such fixed congestion often takes place, as will not yield to general bleeding.

XVI. Much has been said likewise about the proper time for bleeding in fevers. It may be used at all times, when indicated by the pulse and other circumstances, in continual fevers; but it should be used chiefly in the paroxysms of such as intermit. I have conceived this practice to be of so much consequence, that, when I expect a return of the fever in the night, I request one of my pupils to sit up with my patients all night, in order to meet the paroxysm, if necessary, with the lancet. But I derive another advantage from fixing a centinel over a patient in a malignant fever. When a paroxysm goes off in the night, it often leaves the system in a state of such extreme debility, as to endanger life. In this case, from five to ten drops of laudanum, exhibited by a person who is a judge of the pulse, obviate this alarming debility, and often induce easy and refreshing sleep. By treating the human body like a corded instrument, in thus occasionally relaxing or bracing the system, according to the excess or deficiency of stimulus, in those hours in which death most frequently occurs, I think I have been the means of saving several valuable lives.

XVII. The different positions of the body influence the greater or less degrees of relief which are obtained by blood-letting. Where there is a great

disposition to syncope, and where it is attended with alarming and distressing circumstances, blood should be drawn in a recumbent posture, but where there is no apprehension or dread of fainting, it may be taken in a sitting posture. The relief will be more certain if the patient be able to stand while he is bled. A small quantity of blood, drawn in this posture, brings on fainting, and the good effects which are often derived from it. It should therefore be preferred, where patients object to copious or frequent bleedings. The history of the success of this practice in the British army, recently mentioned from Dr. Sydenham, furnishes a strong argument in its favour.

I regret that the limits I have fixed to this Defence of Blood-letting will not admit of my applying the principles which have been delivered, to all the inflammatory states of fever. In a future essay, I hope to establish its efficacy in the manaical state of fever. I have said that madness is the effect of a chronic inflammation in the brain. Its remedy, of course, should be frequent and copious blood-letting. Physical and moral evil are subject to similar laws. The mad-shirt, and all the common means of coercion, are as improper substitutes for bleeding, in madness, as the whipping-post and pillory are for solitary confinement

and labour, in the cure of vice. The pulse should govern the use of the lancet in this, as well as in all the *ordinary* states of fever. It is the dial-plate of the system. But in the *misplaced* states of fever, the pulse, like folly in old age, often points at a different mark from nature. In all such cases, we must conform our practice to that which has been successful in the reigning epidemic. A single bleeding, when indicated by this circumstance, often converts a fever from a suffocated, or latent, to a sensible state, and thus renders it a more simple and manageable disease.

It is worthy of consideration here, how far local diseases, which have been produced by fevers, might be cured by re-exciting the fever. Sir William Jones says, the physicians in Persia always begin the cure of the leprosy by blood-letting*. Possibly this remedy diffuses the disease through the blood-vessels, and thereby exposes it to be more easily acted upon by other remedies.

Having mentioned the states of fever in which blood-letting is indicated, and the manner in which it should be performed, I shall conclude this inquiry by pointing out the states of fever in which

* Asiatic Essays.

it is forbidden, or in which it should be cautiously or sparingly performed. This subject is of consequence, and should be carefully attended to by all who wish well to the usefulness and credit of the lancet.

1. It is forbidden in that state of fever, as well as in other diseases, in which there is reason to believe the brain or viscera are engorged with blood, and the whole system prostrated below the point of re-action. I have suggested this caution in another place*. The pulse in these cases is feeble, and sometimes scarcely perceptible, occasioned by the quantity of blood in the blood-vessels being reduced, in consequence of the stagnation of large portions of it in the viscera. By bleeding in these cases, we deprive the blood-vessels of the feeble remains of the stimulus which keep up their action, and thus precipitate death. The remedies here should be frictions, and stimulating applications to the extremities, and gentle stimuli taken by the mouth, or injected into the bowels. As soon as the system is a little excited by these remedies, blood may be drawn, but in small quantities at a time, and perhaps only by means of cups or leaches applied to the seats of the congestions of

* Vol. iii.

the blood. After the vessels are excited by the equable diffusion of the blood through all their parts, it may with safety be drawn from the arm, provided it be indicated by the pulse.

2. It is seldom proper beyond the third day, in a malignant fever, if it has not been used on the days previous to it, and for the same reason that has been given under the former head. Even the tension of the pulse is not always a sufficient warrant to bleed, for in three days, in a fever which runs its course in five days, the disorganization of the viscera is so complete, that a recovery is scarcely to be expected from the lancet. The remedies which give the only chance of relief in this case, are purges, blisters, and a salivation.

3. Where fevers are attended with paroxysms, bleeding should be omitted, or used with great caution, in the close of those paroxysms. The debility which accompanies the intermission of the fever is often so much increased by the recent loss of blood, as sometimes to endanger life.

4. Bleeding is forbidden, or should be used cautiously in that malignant state of fever, in which a weak morbid action, or what Dr. Darwin calls a tendency to inirritability, takes place in the blood.

vessels. It is known by a weak and frequent pulse, such as occurs in the typhus fever, and in the plague in warm climates. I have often met with it in the malignant sore throat, and occasionally in the pleurisy and yellow fever. The remedies here should be gentle vomits or purges, and afterwards cordials. Should the pulse be too much excited by them, bleeding may be used to reduce it.

5. It should be used sparingly in the diseases of habitual drunkards. The morbid action in such persons, though often violent, is generally transient. It may be compared to a soap-bubble. The arteries, by being often overstretched by the stimulus of strong drink, do not always contract with the diminution of blood, and such patients often sink, from this cause, from the excessive use of the lancet.

6. It has been forbidden after the suppurative process has begun in local inflammation. It constantly retards the suppuration, when begun, in the angina tonsillaris, and thus protracts that disease. To this rule there are frequent exceptions.

7. It should be omitted in pneumony, after copious expectoration has taken place. This dis-

charge is local depletion, and, though slow in its effects compared with bleeding, it serves the same purpose in relieving the lungs. The lancet can only be required where great pain in coughing, and a tense pulse, attend this stage of the disease.

8. It may be omitted (except when the blood-vessels are insulated) in those diseases in which there is time to wait, without danger to life, or future health, for the circuitous operation of purging medicines, or abstemious diet.

9. It should be avoided, when it can be done without great danger to life, where there is a great and constitutional dread of the operation. In such cases, it has sometimes done harm to the patient, and injured the credit of the lancet.

10. There are cases in which sizy blood should not warrant a repetition of blood-letting. Mr. White informs us, in the History of the Bilious Fever which has lately prevailed at Bath, that bleeding, in many cases in which this appearance of the blood took place, was useless or hurtful. In some of the fevers of our own country, we sometimes see sizy blood followed by symptoms which forbid the repeated use of the lancet, but which yield to other depleting remedies, or to such as are of a cordial

nature. I have seen the same kind of blood, a few hours before death, in a pulmonary consumption, and three days after a discharge of a gallon and a half of blood from the stomach by vomiting.

11. Even a tense pulse does not always call for the repeated use of the lancet. I have mentioned one case, viz. on the third or fourth days of a malignant fever, in which it is improper. There are instances of incurable consumptions from tubercles and ulcers in the lungs, in which the pulse cannot be made to feel the least diminution of tension by either copious or frequent bleedings. There are likewise cases of hepatic fever, in which the pulse cannot be subdued by this remedy. This tense state of the pulse is the effect of a suppurative process in the liver. If a sufficient quantity of blood has been drawn in the first stage of this disease, there is little danger from leaving the pulse to reduce or wear itself down by a sudden or gradual discharge of the hepatic congestion. The recovery in this case is slow, but it is for the most part certain. I have once known a dropsy and death induced by the contrary practice.

12. and lastly. There is sometimes a tension in the pulse in hæmorrhages, that will not yield to the lancet. The man whose blood was sizy, three

days after losing a gallon and a half of it from his stomach, had a tense pulse the day before he died; and I once perceived its last strokes to be tense, in a patient whom I lost in a yellow fever by a hæmorrhage from the nose. The only circumstance that can justify bleeding in these cases is extreme pain, in which case, the loss of a few ounces of blood is a more safe and effectual remedy than opium.

I shall now add a few remarks upon the efficacy of blood-letting, in diseases which are not supposed to belong to the class of fevers, and which have not been included in the preceding volumes.

I. The philosophers, in describing the humble origin of man, say that he is formed "inter stercus et urinam." The divines say that he is "conceived in sin, and shapen in iniquity." I believe it to be equally true, and alike humiliating, that he is conceived and brought forth in disease.

This disease appears in pregnancy and parturition. I shall first endeavour to prove this to be the case, and afterwards mention the benefits of blood-letting in relieving it, in both cases.

In pregnancy, the uterus is always affected with that grade of morbid action which I formerly called inflammation. This is evident from its exhibiting all its usual phænomena in other parts of the body. These are,

1. Swelling, or enlargement.

2. Hæmorrhage. The lochia are nothing but a slow and spontaneous bleeding performed by nature, and intended to cure the inflammation of the uterus after parturition.

3. Abscesses, schirri, and cancers. It is true, those disorders sometimes occur in women that have never borne children. In these cases, they are the effects of the inflammation excited by the menstrual disease.

4. A full, quick, and tense or frequent pulse; pain; want of appetite*; sickness at stomach; puking; syncope; and sometimes convulsions in every part of the body.

* Dr. Hunter used to teach, in his lectures, that the final cause of the want of appetite, during the first months of pregnancy, was to obviate plethora, which disposed to abortion. This plethora should have been called an inflammatory disease, in which abstinence is useful.

5. Sizy blood. This occurs almost uniformly in pregnancy.

6. A membrane. Dr. Scarpa has proved the membrana decidua, which is formed during pregnancy, to be in every respect the same in its properties with the membrane which is formed upon other inflamed surfaces, particularly the trachea, the pleura, and the inside of the bowels. Thus we see all the common and most characteristic symptoms and effects of inflammation, in other parts of the body, are exhibited by the uterus in pregnancy.

These remarks being premised, I proceed to remark, that blood-letting is indicated, in certain states of pregnancy, by all the arguments that have been used in favour of it in any other inflammatory disease. The degree of inflammation in the womb, manifested by the pulse, pain, and other signs of disease, should determine the quantity of blood to be drawn. Low diet, gentle purges, and constant exercise, are excellent substitutes for it, but where they are not submitted to, blood-letting should be employed as a substitute for them. In that disposition to abortion, which occurs about the third month of pregnancy, small and frequent bleedings should be preferred to all other modes of depletion. I can assert, from experience, that they prevent

abortion, nearly with as much certainty as they prevent a hæmorrhage from the lungs: for what is an abortion but a hæmoptysis (if I may be allowed the expression) from the uterus? During the last month of pregnancy, the loss of from twelve to twenty ounces of blood has the most beneficial effects, in lessening the pains and danger of childbirth, and in preventing its subsequent diseases.

The doctrine I have aimed to establish leads, not only to the use of blood-letting in the disease of pregnancy, when required, but to a more copious use of it, when combined with other diseases, than in those diseases in a simple state. This remark applies, in a particular manner, to those spasms and convulsions which sometimes occur in the latter months of pregnancy, Without bleeding, they are always fatal. By copious bleeding, amounting in some instances to 80 and 100 ounces, they are generally cured.

Let it not be supposed that blood-letting is alike proper and useful in every state of pregnancy. There are what are called slow or chronic inflammations, in which the diseased action of the blood-vessels not only forbids it, but calls for cordial and stimulating remedies. The same feeble state of inflammation sometimes takes place in the preg-

nant uterus. In these cases cordials and stimulants should be preferred to the lancet.

Parturition is a higher grade of disease than that which takes place in pregnancy. It consists of convulsive or clonic spasms in the uterus, supervening its inflammation, and is accompanied with chills, heat, thirst, a quick, full, tense, or a frequent and depressed pulse, and great pain. By some divines these symptoms, and particularly pain, have been considered as a standing and unchangeable punishment of the original disobedience of woman, and, by some physicians, as indispensably necessary to enable the uterus to relieve itself of its burden. By contemplating the numerous instances in which it has pleased God to bless the labours and ingenuity of man, in lessening or destroying the effects of the curse inflicting upon the earth, and by attending to the histories of the total exemption from pain in child-bearing that are recorded of the women in the Brasils, Calabria, and some parts of Africa, and of the small degrees of it which are felt by the Turkish women, who reduce their systems by frequent purges of sweet oil during pregnancy, I was induced to believe pain does not accompany child-bearing by an immutable decree of Heaven. By recollecting further how effectually blood-letting relieves many other spas-

modic and painful diseases, and how suddenly it relaxes rigidity in the muscles, I was led, in the year 1795, to suppose it might be equally effectual in lessening the violence of the disease and pains of parturition. I was encouraged still more to expect this advantage from it, by having repeatedly observed the advantages of copious bleeding for inflammatory fevers, just before delivery, in mitigating its pains, and shortening its duration. Upon my mentioning these reflections and facts to Dr. Dewees, I was much gratified in being informed, that he had been in the practice, for several years before his removal from Abingdon to Philadelphia, of drawing *large* quantities of blood during parturition, and with all the happy effects I had expected from it. The practice has been strongly inculcated by the doctor in his lectures upon midwifery, and has been ably defended and supported by a number of recent facts, in an ingenious inaugural dissertation, published by Dr. Peter Miller, in the year 1804. It has been generally adopted by the practitioners of midwifery, of both sexes, in Philadelphia.

I do not mean to insinuate that bleeding is a new remedy in parturition. It has long ago been advised and used in France, and even by the midwives of Genoa, in Italy, but never, in any country,

in the large quantities that have been recommended by Dr. Dewees, that is, from 20 to 80 ounces, or until signs of fainting are induced, nor under the influence of the theory of parturition, being a violent disease.

But the advantages of this remedy are not confined to lessening the pains of delivery. It prevents after pains; favours the easy and healthy secretion of milk; prevents sore breasts, swelled legs, puerperile fever, and all the distressing train of anomalous complaints that often follow child-bearing. Dr. Hunter informed his pupils, in his lectures upon midwifery, in the year 1769, that he had often observed the most rapid recoveries to succeed the most severe labours. The severity of the pains in these cases created a disease, which prevented internal congestions in the womb. Bleeding, by depleting the uterus, obviates at once both disease and congestion. Its efficacy is much aided by means of glysters, which, by emptying the lower bowels, lessen the pressure upon the uterus.

Let it not be inferred, from what has been said in favour of blood-letting in parturition, that it is proper in all cases. Where there has been great previous inanition, and where there are marks of languor,

and feeble morbid action in the system, the remedies should be of an opposite nature. Opium and other cordials are indicated in these cases. Their salutary effects in exciting the action of the uterus, and expediting delivery, are too well known to be mentioned.

I have expressed a hope in another place*, that a medicine would be discovered that should suspend sensibility altogether, and leave irritability, or the powers of motion, unimpaired, and thereby destroy labour pains altogether. I was encouraged to cherish this hope, by having known delivery to take place, in one instance, during a paroxysm of epilepsy, and having heard of another, during a fit of drunkenness, in a woman attended by Dr. Church, in both of which there was neither consciousness, nor recollection of pain.

2. During the period in which the menses are said to dodge, and for a year or two after they cease to flow, there is a morbid fulness and excitement in the blood-vessels, which are often followed by head-ach, cough, dropsy, hæmorrhages, glandular obstructions, and cancers. They may all be prevented by frequent and moderate bleedings.

* Medical Repository, vol. vi.

3. It has been proved, by many facts, that opium, when taken in an excessive dose, acts by inducing a similar state of the system with that which is induced by the miasmata which bring on malignant and inflammatory fevers. The remedy for the disease produced by it (where a vomiting cannot be excited to discharge the opium) has been found to be copious blood-letting. Of its efficacy, the reader will find an account in four cases, published in the fifth volume of the New-York Medical Repository.

4. It is probable, from the uniformly stimulating manner in which poisons of all kinds act upon the human body, that bleeding would be useful in obviating their baneful effects. Dr. John Dorsey has lately proved its efficacy, in the case of a child that was affected with convulsions, in consequence of eating the leaves of the datura stramonium.

5. It has been the misfortune of diabetes to be considered by physicians as exclusively a local disease of weak morbid action, or as the effect of simple debility in the kidneys; and hence stimulating and tonic medicines have been exclusively prescribed for it. This opinion is not a correct one. It often affects the whole arterial system, more especially in its first stage, with great morbid action. In two cases of it, where this state of the blood-

vessels took place, I have used blood-letting with success, joined with the common remedies for inflammatory diseases.

6. In dislocated bones which resist both skill and force, it has been suggested, that bleeding, till fainting is induced, would probably induce such a relaxation in the muscles as to favour their reduction. This principle was happily applied, in the winter of 1795, by Dr. Physick, in the Pennsylvania hospital, in a case of dislocated humerus of two months continuance. The doctor bled his patient till he fainted, and then reduced his shoulder in less than a minute, and with very little exertion of force. The practice has since become general in Philadelphia, in luxations of large bones, where they resist the common degrees of strength employed to reduce them.

In contemplating the prejudices against blood-letting, which formerly prevailed so generally in our country, I have been led to ascribe them to a cause wholly political. We are descended chiefly from Great-Britain, and have been for many years under the influence of English habits upon all subjects. Some of these habits, as far as they relate to government, have been partly changed; but in dress, arts, manufactures, manners, and science,

we are still governed by our early associations. Britain and France have been, for many centuries, hereditary enemies. The hostility of the former to the latter nation, extends to every thing that belongs to their character. It discovers itself, in an eminent degree, in diet and medicine. Do the French love soups? the English prefer solid flesh. Do the French love their meats well cooked? the English prefer their meats but half roasted. Do the French sip coffee after dinner? the English spend their afternoons in drinking Port and Madeira wines. Do the French physicians prescribe purges and glysters to cleanse the bowels? the English physicians prescribe vomits for the same purpose. Above all, do the French physicians advise bleeding in fevers? the English physicians forbid it, in most fevers, and substitute sweating in the room of it. Here then we discover the source of the former prejudices and errors of our countrymen, upon the subject of blood-letting. They are of British origin. They have been inculcated in British universities, and in British books; and they accord as ill with our climate and state of society, as the Dutch foot stoves did with the temperate climate of the Cape of Good Hope*.

* I have frequently been surprised, in visiting English patients, to hear them say, when I have prescribed bleeding,

It is probable the bad consequences which have followed the indiscriminate use of the lancet in France, and some other countries, may have contributed in some degree to create the prejudices against it, which are entertained by the physicians in Great-Britain. Bleeding, like opium, has lost its character, in many cases, by being prescribed for the *name* of a disease. It is still used, Mr. Townsend tells us, in this empirical way in Spain, where a physician, when sent for to a patient, orders him to be bled before he visits him. The late just theory of the manner in which opium acts upon the body, has restrained its mischief, and added greatly to its usefulness. In like manner, may

that their physicians in England had charged them never to be bled. This advice excluded all regard to the changes which climate, diet, new employments, and age might induce upon the system. I am disposed to believe that many lives are lost, and numerous chronic diseases created in Great-Britain, by the neglect of bleeding in fevers. My former pupil, Dr. Fisher, in a letter from the university of Edinburgh, dated in the winter of 1795, assured me, that he had cured several of his fellow-students of fevers (contrary to general prejudice) by early bleeding, in as easy and summary a way as he had been accustomed to see them cured in Philadelphia, by the use of the same remedy. Dr. Gordon, of Scotland, and several other physicians in Great-Britain, have lately revived the lancet, and applied it with great judgment and success to the cure of fevers.

we not hope, that just theories of diseases, and proper ideas of the manner in which bleeding acts in curing them, will prevent a relapse into the evils which formerly accompanied this remedy, and render it a great and universal blessing to mankind?

AN INQUIRY

INTO THE

Comparative State of Medicine,

IN PHILADELPHIA,

BETWEEN THE YEARS 1760 AND 1766,

AND THE YEAR 1805.

AN INQUIRY, &c.

IN estimating the progress and utility of medicine, important advantages may be derived from taking a view of its ancient, and comparing it with its present state. To do this upon an extensive scale, would be difficult, and foreign to the design of this inquiry. I shall therefore limit it, to the history of the diseases and medical opinions which prevailed, and of the remedies which were in use, in the city of Philadelphia, between the years 1760 and 1766, and of the diseases, medical opinions, and remedies of the year 1805. The result of a comparative view of each of them, will determine whether medicine has declined or improved, in that interval of time, in this part of the world.

To derive all the benefits that are possible from such an inquiry, it will be proper to detail the

causes, which, by acting upon the human body, influence the subjects that have been mentioned, in those two remote periods of time.

Those causes divide themselves into climate, diet, dress, and certain peculiar customs; on each of which I shall make a few remarks.

After what has been said, in the history of the Climate of Pennsylvania, in the first volume of these Inquiries, it will only be necessary in this place briefly to mention, that the winters in Philadelphia, between the years 1760 and 1766, were almost uniformly cold. The ground was generally covered with snow, and the Delaware frozen, from the first or second week in December, to the last week in February, or the first week in March. Thaws were rare during the winter months, and seldom of longer duration than three or four days. The springs began in May. The summers were generally warm, and the air seldom refreshed by cool north-west winds. Rains were frequent and heavy, and for the most part accompanied with thunder and lightning. The autumns began in October, and were gradually succeeded by cool and cold weather.

The diet of the inhabitants of Philadelphia, during those years, consisted chiefly of animal food.

It was eaten, in some families, three times, and in all, twice a day. A hot supper was a general meal. To two and three meals of animal food in a day, many persons added what was then called "a relish," about an hour before dinner. It consisted of a slice of ham, a piece of salted fish, and now and then a beef-steak, accompanied with large draughts of punch or toddy. Tea was taken in the interval between dinner and supper.

In many companies, a glass of wine and bitters was taken a few minutes before dinner, in order to increase the appetite.

The drinks, with dinner and supper, were punch and table beer.

Besides feeding thus plentifully in their families, many of the most respectable citizens belonged to clubs, which met in the city in winter, and in its vicinity, under sheds, or the shade of trees, in summer, once and twice a week, and, in one instance, every night. They were drawn together by suppers in winter, and dinners in summer. Their food was simple, and taken chiefly in a solid form. The liquors used with it were punch, London porter, and sound old Madeira wine.

Independently of these clubs, there were occasional meetings of citizens, particularly of young men, at taverns, for convivial purposes. A house in Water-street, known by the name of the Tun tavern, was devoted chiefly to this kind of accidental meetings. They were often followed by midnight sallies into the streets, and such acts of violence and indecency, as frequently consigned the perpetrators of them afterwards into the hands of the civil officers and physicians of the city.

Many citizens, particularly tradesmen, met every evening for the purpose of drinking beer, at houses kept for that purpose. Instances of drunkenness were rare at such places. The company generally parted at ten o'clock, and retired in an orderly manner to their habitations. Morning drams, consisting of cordials of different kinds, were common, both in taverns and private houses, but they were confined chiefly to the lower class of people.

From this general use of distilled and fermented liquors, drunkenness was a common vice in all the different ranks of society.

The dresses of the men, in the years alluded to, were composed of cloth in winter, and of thin woollen or silk stuffs in summer. Wigs composed

the covering of the head, after middle life, and cocked hats were universally worn, except by the men who belonged to the society of friends.

The dresses of the women, in the years before mentioned, consisted chiefly of silks and calicoes. Stays were universal, and hoops were generally worn by the ladies in genteel life. Long cloth or camblet cloaks were common, in cold weather, among all classes of women.

The principal custom under this head, which influenced health and life, was that which obliged women, after lying-in, "to sit up for company;" that is, to dress themselves, every afternoon on the second week after their confinement, and to sit for four or five hours, exposed to the impure air of a crowded room, and sometimes to long and loud conversations.

Porches were nearly universal appendages to houses, and it was common for all the branches of a family to expose themselves upon them, to the evening air. Stoves were not in use, at that time, in any places of public worship.

Funerals were attended by a large concourse of citizens, who were thereby often exposed to great

heat and cold, and sometimes to standing, while the funeral obsequies were performed, in a wet or damp church-yard.

The human mind, in this period of the history of our city, was in a colonized state, and the passions acted but feebly and partially upon literary and political subjects.

We come now to mention the diseases which prevailed in our city between the years 1760 and 1766.

The cholera morbus was a frequent disease in the summer months.

Sporadic cases of dysentery were at that time common. I have never seen that disease epidemic in Philadelphia.

The intermitting fever prevailed in the month of August, and in the autumn, chiefly in the suburbs and neighbourhood of the city. In the year 1765, it was epidemic in Southwark, and was so general, at the same time, as to affect two thirds of the inhabitants of the southern states. This fact is mentioned by Dr. Bond, in a lecture preserved in the

minutes of the managers of the Pennsylvania hospital.

The slow chronic fever, called at that time the nervous fever, was very common, in the autumnal months, in the thickly settled parts of the city.

The bilious fever prevailed, at the same time, in Southwark. The late Dr. Clarkson, who began to practise medicine in that part of the city, in the year 1761, upon hearing some of his medical brethren speak of the appearance of bilious remittents in its middle and northern parts, about the year 1778, said they had long been familiar to him, and that he had met with them every year since his settlement in Philadelphia*.

* From the early knowledge this excellent physician and worthy man had thus acquired of the bilious remitting fever, he was very successful in the treatment of it. It was by instruction conveyed by him to me with peculiar delicacy, that I was first taught the advantages of copious evacuations from the bowels in that disease. I had been called, when a young practitioner, to visit a gentleman with him in a bilious pleurisy. A third or fourth bleeding, which I advised, cured him. The doctor was much pleased with its effect, and said to me afterwards, "Doctor, you and I have each a great fault in our practice; I do not bleed enough, you do not purge enough."

The yellow fever prevailed in the neighbourhood of Spruce-street wharf, and near a filthy stream of water which flowed through what is now called Dock-street, in the year 1762. Some cases of it appeared likewise in Southwark. It was scarcely known in the north and west parts of the city. No desertion of the citizens took place at this time, nor did the fear of contagion drive the friends of the sick from their bed-sides, nor prevent the usual marks of respect being paid to them after death, by following their bodies to the grave. A few sporadic cases of the same grade of fever appeared in the year 1763.

Pneumonies, rheumatisms, inflammatory sore throats, and catarrhs were frequent during the winter and spring months. The last disease was induced, not only by sudden changes in the weather, but often by exposure to the evening air, on porches in summer, and by the damp and cold air of places of public worship in winter.

The influenza was epidemic in the city in the spring of the year 1761.

The malignant sore throat proved fatal to a number of children in the winter of 1763.

The scarlet fever prevailed generally in the year 1764. It resembled the same disease, as described by Dr. Sydenham, in not being accompanied by a sore throat.

Death from convulsions in pregnant women, also from parturition, and the puerperile fever, were common between the years 1760 and 1766. Death was likewise common between the 50th and 60th years of life from gout, apoplexy, palsy, obstructed livers, and dropsies. A club, consisting of about a dozen of the first gentlemen in the city, all paid, for their intemperance, the forfeit of their lives between those ages, and most of them with some one, or more of the diseases that have been mentioned. I sat up with one of that club on the night of his death. Several of the members of it called at his house, the evening before he died, to inquire how he was. One of them, upon being informed of his extreme danger, spoke in high and pathetic terms of his convivial talents and virtues, and said, "he had spent 200 evenings a year with him, for the last twenty years of his life." These evenings were all spent at public houses.

The colica pictonum, or dry gripes, was formerly a common disease in this city. It was sometimes followed by a palsy of the upper and

lower extremities. Colics from crapulas were likewise very frequent, and now and then terminated in death.

Many children died of the cholera infantum, cynanche trachealis, and hydrocephalus internus. The last disease was generally ascribed to worms.

Fifteen or twenty deaths occurred, every summer, from drinking cold pump water, when the body was in a highly excitable state, from great heat and labour.

The small-pox, within the period alluded to, was sometimes epidemic, and carried off many citizens. In the year 1759, Dr. Barnet was invited from Elizabeth-town, in New-Jersey, to Philadelphia, to inoculate for the small-pox. The practice, though much opposed, soon became general. About that time, Dr. Redman published a short defence of it, and recommended the practice to his fellow-citizens in the most affectionate language. The success of inoculation was far from being universal. Subsequent improvements in the mode of preparing the body, and treating the eruptive fever, have led us to ascribe this want of success to the deep wound made in the arm, to the excessive quantity of mer-

cury given to prepare the body, and to the use of a warm regimen in the eruptive fever.

The peculiar customs and the diseases which have been enumerated, by inducing general weakness, rendered the pulmonary consumption a frequent disease among both sexes.

Pains and diseases from decayed teeth were very common, between the years 1760 and 1766. At that time, the profession of a dentist was unknown in the city.

The practice of physic and surgery were united, during those years, in the same persons, and physicians were seldom employed as man-midwives, except in preternatural and tedious labours.

The practice of surgery was regulated by Mr. Sharp's treatise upon that branch of medicine.

Let us now take a view of the medical opinions which prevailed at the above period, and of the remedies which were employed to cure the diseases that have been mentioned.

The system of Dr. Boerhaave then governed the practice of every physician in Philadelphia. Of

course diseases were ascribed to morbid acrimonies, and other matters in the blood, and the practice of those years was influenced by a belief in them. Medicines were prescribed to thin, and to incrassate the blood, and diet drinks were administered in large quantities, in order to alter its qualities. Great reliance was placed upon the powers of nature, and critical days were expected with solicitude, in order to observe the discharge of the morbid cause of fevers from the system. This matter was looked for chiefly in the urine, and glasses to retain it were a necessary part of the furniture of every sick room. To ensure the discharge of the supposed morbid matter of fevers through the pores, patients were confined to their beds, and fresh, with cool air, often excluded by close doors and curtains. The medicines to promote sweats were generally of a feeble nature. The spiritus mindereri, and the spirit of sweet nitre were in daily use for that purpose. In dangerous cases, saffron and Virginia snake-root were added to them.

Blood-letting was used plentifully in pleurisies and rheumatisms, but sparingly in all other diseases. Blood was often drawn from the feet, in order to excite a revulsion of disease from the superior parts of the body. It was considered as unsafe, at

that time, to bleed during the monthly disease of the female sex.

Purges or vomits began the cure of all febrile diseases, but as the principal dependence was placed upon sweating medicines, those powerful remedies were seldom repeated in the subsequent stages of fevers. To this remark there was a general exception in the yellow fever of 1762. Small doses of glauber's salts were given every day after bleeding, so as to promote a gentle, but constant discharge from the bowels.

The bark was administered freely in intermittents. The prejudices against it at that time were so general among the common people, that it was often necessary to disguise it. An opinion prevailed among them, that it lay in their bones, and that it disposed them to take cold. It was seldom given in the low and gangrenous states of fever, when they were not attended with remissions.

The use of opium was confined chiefly to ease pain, to compose a cough, and to restrain preternatural discharges from the body. Such were the prejudices against it, that it was often necessary to conceal it in other medicines. It was rarely taken without the advice of a physician.

Mercury was in general use in the years that have been mentioned. I have said it was given to prepare the body for the small-pox. It was administered by my first preceptor in medicine, Dr. Redman, in the same disease, when it appeared in the natural way, with malignant or inflammatory symptoms, in order to keep the salivary glands open and flowing, during the turn of the pock. He gave it likewise liberally in the dry gripes. In one case of that disease, I well remember the pleasure he expressed, in consequence of its having affected his patient's mouth.

But to Dr. Thomas Bond the city of Philadelphia is indebted for the introduction of mercury into general use, in the practice of medicine. He called it emphatically "a revolutionary remedy," and prescribed it in all diseases which resisted the common modes of practice. He gave it liberally in the cynanche trachealis. He sometimes cured madness, by giving it in such quantities as to excite a salivation. He attempted to cure pulmonary consumption by it, but without success; for, at that time, the influence of the relative actions of different diseases and remedies, upon the human body, was not known, or, if known, no advantage was derived from it in the practice of medicine.

The dry gripes were cured, at that time, by a new and peculiar mode of practice, by Dr. Thomas Cadwallader. He kept the patient easy by gentle anodynes, and gave lenient purges only in the beginning of the disease; nor did he ever assist the latter by injections till the fourth and fifth days, at which time the bowels discharged their contents in an easy manner. It was said this mode of cure prevented the paralytic symptoms, which sometimes follow that disease. It was afterwards adopted and highly commended by the late Dr. Warren, of London.

Blisters were in general use, but seldom applied before the latter stage of fevers. They were prescribed, for the first time, in hæmorrhages, and with great success, by Dr. George Glentworth.

Wine was given sparingly, even in the lowest stage of what were then called putrid and nervous fevers.

The warm and cold baths were but little used in private practice. The former was now and then employed in acute diseases. They were both used in the most liberal manner, together with the vapour and warm air baths, in the Pennsylvania hospital, by Dr. Thomas Bond. An attempt was

made to erect warm and cold baths, in the neighbourhood of the city, and to connect them with a house of entertainment, by Dr. Lauchlin M'Clen, in the year 1761. The project was considered as unfriendly to morals, and petitions, from several religious societies, were addressed to the governor of the province, to prevent its execution. The enterprize was abandoned, and the doctor soon afterwards left the city.

Riding on horseback, the fresh air of the seashore, and long journies, were often prescribed to invalids, by all the physicians of that day.

I come now to mention the causes which influence the diseases, also the medical opinions and remedies of the present time. In this part of our discourse, I shall follow the order of the first part of our inquiry.

I have already taken notice of the changes which the climate of Philadelphia has undergone since the year 1766.

A change has of late years taken place in the dress of the inhabitants of Philadelphia. Wigs have generally been laid aside, and the hair worn cut and dressed in different ways. Round hats,

with high crowns, have become fashionable. Umbrellas, which were formerly a part of female dress only, are now used in warm and wet weather, by men of all ranks in society; and flannel is worn next to the skin in winter, and muslin in summer, by many persons of both sexes. Tight dresses are uncommon, and stays are unknown among our women. It is to be lamented that the benefits to health which might have been derived from the disuse of that part of female dress, have been prevented by the fashion of wearing such light coverings over the breasts and limbs. The evils from this cause, shall be mentioned hereafter.

A revolution has taken place in the diet of our citizens. Relishes and suppers are generally abolished; bitters, to provoke a preternatural appetite, also meridian bowls of punch, are now scarcely known. Animal food is eaten only at dinner, and excess in the use of it is prevented, by a profusion of excellent summer and winter vegetables.

Malt liquors, or hydrant water, with a moderate quantity of wine, are usually taken with those simple and wholesome meals.

Clubs, for the exclusive purpose of feeding, are dissolved, and succeeded by family parties, col-

lected for the more rational entertainments of conversation, dancing, music, and chess. Taverns and beer-houses are much less frequented than formerly, and drunkenness is rarely seen in genteel life. The tea table, in an evening, has now become the place of resort of both sexes, and the midnight serenade has taken place of the midnight revels of the young gentlemen of former years.

In doing justice to the temperance of the modern citizens of Philadelphia, I am sorry to admit, there is still a good deal of secret drinking among them. Physicians, who detect it by the diseases it produces, often lament the inefficacy of their remedies to remove them. In addition to intemperance from spiritous liquors, a new species of intoxication from opium has found its way into our city. I have known death, in one instance, induced by it.

The following circumstances have had a favourable influence upon the health of the present inhabitants of Philadelphia.

The improvements in the construction of modern houses, so as to render them cooler in summer, and warmer in winter.

The less frequent practice of sitting on porches, exposed to the dew, in summer evenings.

The universal use of stoves in places of public worship.

The abolition of the custom of obliging lying-in women to sit up for company.

The partial use of Schuylkill or hydrant water, for culinary and other purposes.

The enjoyment of pure air, in country seats, in the neighbourhood of the city. They not only preserve from sickness during the summer and autumn, but they render families less liable to diseases during the other seasons of the year.

And, lastly, the frequent use of private, and public warm and cold baths. For the establishment of the latter, the citizens of Philadelphia are indebted to Mr. Joseph Simons.

The following circumstances have an unfavourable influence upon the health of our citizens.

Ice creams taken in excess, or upon an empty stomach.

The continuance of the practice of attending funerals, under all the circumstances that were men-

tioned in describing the customs which prevailed in Philadelphia, between the years 1760 and 1766.

The combined influence of great heat and intemperance in drinking, acting upon passions unusually excited by public objects, on the 4th of July, every year.

The general and inordinate use of segars.

The want of sufficient force in the water which falls into the common sewers to convey their contents into the Delaware, renders each of their apertures a source of sickly exhalations to the neighbouring streets and squares.

The compact manner in which the gutters are now formed, by preventing the descent of water into the earth, has contributed very much to retain the filth of the city, in those seasons in which they are not washed by rain, nor by the waste water of the pumps and hydrants.

The timbers of many of the wharves of the city have gone to decay. The docks have not been cleaned since the year 1774, and many of them expose large surfaces to the action of the sun at low water. The buildings have increased in Water-

street, and with them there has been a great increase of that kind of filth which is generated in all houses; the stores in this street often contain matters which putrify; from all which there is, in warm weather, a constant emission of such a fœtid odour, as to render a walk through that street, by a person who does not reside there, extremely disagreeable, and sometimes to produce sickness and vomiting.

In many parts of the vicinity of the city are to be seen pools of stagnating water, from which there are exhaled large quantities of unhealthy vapours, during the summer and autumnal months.

The privies have become so numerous, and are often so full, as to become offensive in most of the compact parts of the city, more especially in damp weather.

The pump water is impregnated with many saline and aërial matters of an offensive nature.

While these causes exert an unfriendly influence upon the bodies of the citizens of Philadelphia, the extreme elevation or depression of their passions, by the different issues of their political contests (now far surpassing, in their magnitude, the contests of former years), together with their many

new and fortuitous modes of suddenly acquiring and losing property, predispose them to many diseases of the mind.

The present diseases of Philadelphia come next under our consideration.

Fevers have assumed several new forms since the year 1766. The mild bilious fever has gradually spread over every part of the city. It followed the filth which was left by the British army in the year 1778. In the year 1780, it prevailed, as an epidemic, in Southwark, and in Water and Front-streets, below Market-street*. In the years 1791 and 1792, it assumed an inflammatory appearance, and was accompanied, in many cases, with hepatic affections. The connection of our subject requires that I should barely repeat, that it appeared in 1793 as an epidemic, in the form of what is called yellow fever, in which form it has appeared, in sporadic cases, or as an epidemic, every year since.

* It appears, from the account given by Mr. White of the bilious fever of Bath, that it prevailed several years in its suburbs, before it became general in that city. It is remarkable, that Southwark was nearly the exclusive seat, not only of the bilious or break-bone fever of 1780, but of the intermitting fever in 1765, taken notice of by Dr. Bond, and of the yellow fever of 1805.

During the reign of this high grade of bilious fever, mild intermittents and remittents, and the chronic or nervous forms of the summer and autumnal fever, have nearly disappeared.

Inflammations and obstructions of the liver have been more frequent than in former years, and even the pneumonies, catarrhs, intercurrent, and other fevers of the winter and spring months, have all partaken more or less of the inflammatory and malignant nature of the yellow fever.

The pulmonary consumption continues to be a common disease among both sexes.

The cynanche trachealis, the scarlatina anginosa, the hydrocephalus internus, and cholera infantum, are likewise common diseases in Philadelphia.

Madness, and several other diseases of the mind, have increased since the year 1766, from causes which have been mentioned.

Several of the different forms of gout are still common among both sexes.

Apoplexy and palsy have considerably diminished in our city. It is true, the bills of morta-

lity still record a number of deaths from the former, every year; but this statement is incorrect, if it mean a disease of the brain only, for sudden deaths from all their causes are returned exclusively under the name of apoplexy. The less frequent occurrence of this disease, also of palsy, is probably occasioned by the less consumption of animal food, and of distilled and fermented liquors, by that class of citizens who are most subject to them, than in former years. Perhaps the round hat, and the general use of umbrellas, may have contributed to lessen those diseases of the brain.

The dropsy is now a rare disease, and seldom seen even in our hospital.

The colica pictonum, or dry gripes, is scarcely known in Philadelphia. I have ascribed this to the use of flannel next to the skin as a part of dress, and to the general disuse of punch as a common drink.

The natural small-pox is nearly extirpated, and the puerperile fever is rarely met with in Philadelphia. The scrophula is much less frequent than in former years. It is confined chiefly to persons in humble life.

I proceed, in the order that was proposed, to take notice of the present medical opinions which prevail among the physicians of Philadelphia. The system of Dr. Boerhaave long ago ceased to regulate the practice of physic. It was succeeded by the system of Dr. Cullen. In the year 1790, Dr. Brown's system of medicine was introduced and taught by Dr. Gibbon. It captivated a few young men for a while, but it soon fell into disrepute. Perhaps the high-toned diseases of our city exposed the fallacy and danger of the remedies inculcated by it, and afforded it a shorter life than it has had in many other countries. In the year 1790, the author of this inquiry promulgated some new principles in medicine, suggested by the peculiar phænomena of the diseases of the United States. These principles have been so much enlarged and improved by the successive observations and reasonings of many gentlemen in all the states, as to form an American system of medicine. This system rejects the nosological arrangement of diseases, and places all their numerous forms in morbid excitement, induced by irritants acting upon previous debility. It rejects, likewise, all prescriptions for the names of diseases, and, by directing their applications wholly to the forming and fluctuating states of diseases, and the system, derives from a few active medicines all the advantages which have been

in vain expected from the numerous articles which compose European treatises upon the materia medica. This system has been adopted by a part of the physicians of Philadelphia, but a respectable number of them are still attached to the system of Dr. Cullen.

A great change has taken place in the remedies which are now in common use in Philadelphia. I shall briefly mention such of them as are new, and then take notice of the new and different modes of exhibiting such as were in use between the years 1760 and 1766.

Vaccination has been generally adopted in our city, in preference to inoculation with variolous matter.

Digitalis, lead, zinc, and arsenic are now common remedies in the hands of most of our practitioners.

Cold air, cold water, and ice are among the new remedies of modern practice in Philadelphia.

Blood-letting is now used in nearly all diseases of violent excitement, not only in the blood-vessels, but in other parts of the body. Its use is not,

as in former times, limited to ounces in specific diseases, but regulated by their force, and the importance of the parts affected to health and life; nor is it forbidden, as formerly, in infancy, in extreme old age, in the summer months, nor in the period of menstruation, where symptoms of a violent, or of a suffocated disease, manifested by an active or a feeble pulse, indicate it to be necessary.

Leeches are now in general use in diseases which are removed, by their seat or local nature, beyond the influence of the lancet. For the introduction of this excellent remedy into our city we are indebted to Mr. John Cunitz.

Opium and bark, which were formerly given in disguise, or with a trembling hand, are now, not only prescribed by physicians, but often purchased, and taken without their advice, by many of the citizens of Philadelphia. They even occupy a shelf in the closets of many families.

The use of mercury has been revived, and a salivation has been extended, with great improvements and success, to nearly all violent and obstinate diseases. Nor has the influence of reason over ignorance and prejudice, with respect to that noble medicine, stopped here. Cold water, once sup-

posed to be incompatible with its use, is now applied to the body, in malignant fevers, in order to insure and accelerate its operation upon the salivary glands.

Wine is given in large quantities, when indicated, without the least fear of producing intoxication.

The warm and cold baths, which were formerly confined chiefly to patients in the Pennsylvania hospital, are now common prescriptions in private practice.

Exercise, country air, and the sea shore, are now universally recommended in chronic diseases, and in the debility which precedes and follows them.

Great pains are now taken to regulate the quantity and quality of aliments and drinks, by the peculiar state of the system.

Let us now inquire into the influence of the new opinions in medicine, and the new remedies which have been mentioned, upon human life.

The small-pox, once the most fatal and universal of all diseases, has nearly ceased to occupy a

place in our bills of mortality, by the introduction of vaccination in our city. For the prompt adoption of this great discovery, the citizens of Philadelphia owe a large debt of gratitude to Dr. Coxe, and Mr. John Vaughan.

Fevers, from all their causes, and in all their forms, with the exception of the bilious yellow fever, now yield to medicine. Even that most malignant form of febrile diseases is treated with more success in Philadelphia than in other countries. It would probably seldom prove mortal, did a belief in its being derived from an impure atmosphere, and of its exclusive influence upon the body, while it prevailed as an epidemic, obtain universally among the physicians and citizens of Philadelphia.

The pulmonary consumption has been prevented, in many hundred instances, by meeting its premonitory signs, in weakness and feeble morbid excitement in the whole system, by country air, gentle exercise, and gently stimulating remedies. Even when formed, and tending rapidly to its last stage, it has been cured by small and frequent bleedings, digitalis, and a mercurial salivation.

The hydrocephalus internus, the cynanche trachealis, and cholera infantum, once so fatal to the

children of our city, now yield to medicine in their early stages. The two former are cured by copious bleeding, aided by remedies formerly employed in them without success. The last is cured by moderate bleeding, calomel, laudanum, and country air.

The gout has been torn from its ancient sanctuary in error and prejudice, and its acute paroxysms now yield with as much certainty to the lancet, as the most simple inflammatory diseases.

The dropsy is cured by renouncing the unfortunate association of specific remedies with its name, and accommodating them to the degrees of excitement in the blood-vessels.

The tetanus from wounds is now prevented, in most cases, by inflaming the injured parts, and thereby compelling them to defend the whole system, by a local disease. Where this preventing remedy has been neglected, and where tetanus arises from other causes than wounds, it has often been cured by adding to the diffusible stimulus of opium, the durable stimuli of bark and wine.

Death from drinking cold water, in the heated state of the body, is now obviated by previously

wetting the hands or feet with the water; and when this precaution is neglected, the disease induced by it is generally cured by large doses of liquid laudanum.

Madness, which formerly doomed its miserable subjects to cells or chains for life, has yielded to bleeding, low diet, mercury, the warm and cold baths, fresh air, gentle exercise, and mild treatment, since its seat has been discovered to be in the blood-vessels of the brain.

The last achievement of our science in Philadelphia, that I shall mention, consists in the discovery and observation of the premonitory signs of violent and mortal diseases, and in subduing them by simple remedies, in their forming state. By this means, death has been despoiled of his prey, in many hundred instances.

In this successful conflict of medicine with disease and death, midwifery and surgery have borne a distinguished part. They derive their claims to the gratitude of the citizens of Philadelphia from the practice of each of them being more confined, than formerly, to a few members of our profession. It is in consequence of the former being exercised only by physicians of regular and extensive educa-

tions, that death from pregnancy and parturition is a rare occurrence in Philadelphia.

I should greatly exceed the limits prescribed to this inquiry, should I mention how much pain and misery have been relieved, and how often death has been baffled in his attempts upon human life, by several late improvements in old, and the discovery of new remedies in surgery. I shall briefly name a few of them.

In cases of blindness, from a partial opacity of the cornea, or from a closure of the natural pupil, a new pupil has been made; and where the cornea has been partially opaque, the opening through the iris has been formed, opposite to any part of it, which retained its transparency.

The cure of fractures has been accelerated by blood-letting, and, where the union of a broken bone has not taken place from a defect of bony matter, it has been produced by passing a seton between the fractured ends of the bone, and effecting a union thereby between them. Luxations, which have long resisted both force and art, have been reduced in a few minutes, and without pain, by bleeding at deliquium animi.

Old sores have been speedily healed, by destroying their surfaces, and thereby placing them in the condition of recent accidents.

The fruitless application of the trepan, in concussions of the brain, has been prevented by copious bleeding, and a salivation.

A suppression of urine has been cured, by the addition of a piece of a bougie to a flexible catheter.

Strictures in the urethra have been removed by means of a caustic, also, in a more expeditious way, by dividing them with a lancet.

Hydrocele has been cured by a small puncture, and afterwards exciting inflammation and adhesion by an injection of wine into the tunica vaginalis testis.

The popliteal aneurism and varicose veins have both been removed by operations that were unknown a few years ago.

For the introduction of several of those new surgical remedies, and for the discovery and improvement of others, the citizens of Philadelphia are in-

debted to Dr. Physick. They are likewise indebted to him and Dr. Griffitts for many of the new and successful modes of practice, in the diseases that have been mentioned. Even the few remedies that have been suggested by the author of these inquiries, owe their adoption and usefulness chiefly to the influence of those two respectable and popular physicians.

Before I dismiss this part of our subject, I have only to add, that since the cure and extraction of the teeth have become a distinct branch of the profession of medicine, several diseases which have arisen from them, when decayed, have been detected and cured*.

We have thus taken a comparative view of the medical theories and remedies of former and modern times, and of their different influence upon human life. To exhibit the advantages of the latter over the former, I shall mention the difference in the number of deaths in three successive years, at a time when the population of the city and suburbs was supposed to amount to 30,000 souls,

* The late Mr. Andrew Spence was the first regular bred dentist that settled in Philadelphia. There are now several well educated gentlemen in the city of that profession.

and in three years, after the population exceeded double that number.

Between the 25th of December, 1771, and the 25th of December, 1772, there died 1291 persons.

Between the same days of the same months, in 1772 and 1773, there died 1344 persons.

Within the same period of time, between 1773 and 1774, the deaths amounted to 1021, making in all 3,656. I regret that I have not been able to procure the returns of deaths in years prior to those which have been mentioned. During the three years that have been selected, no unusually mortal diseases prevailed in the city. The measles were epidemic in 1771, but were not more fatal than in common years.

Between the 25th of December, 1799, and the 25th of December, 1800, there died 1525 persons.

Between the same days of the same months, in the years 1801 and 1802, there died 1362 persons.

Within the same period of time, between 1802 and 1803, the deaths amounted to 1796, making in all 4,883.

Upon these returns it will be proper to remark, that several hundreds of the deaths, in 1802 and 1803, were from the yellow fever, and that many of them were of strangers. Of 68 persons, who were interred in the Swedes' church-yard alone, one half were of that description of people. Deducting 500 from both those causes of extra-mortality in the three years, between 1799 and 1803, the increase of deaths above what they were in the years 1771 and 1774 is but 727. Had diseases continued to be as mortal as they were thirty years ago, considering the present state of our population, the number of deaths would have been more than 7,312.

To render the circumstances of the statement of deaths that has been given perfectly equal, it will be necessary to add, that the measles prevailed in the city, in the year 1802, as generally as they did in 1771.

From the history that has been given, of the effects of the late improvements and discoveries in medicine upon human life, in Philadelphia, we are led to appreciate its importance and usefulness. It has been said, by its enemies, to move; but its motions have been asserted to be only in a circle. The facts that have been stated clearly prove, that

it has moved, and rapidly too, within the last thirty years, in a straight line.

To encourage and regulate application and enterprize in medicine hereafter, let us inquire to what causes we are indebted for the late discoveries and improvements in our science, and for their happy effects in reducing the number of deaths so far below their former proportion to the inhabitants of Philadelphia.

The first cause I shall mention is the great physical changes which have taken place in the manners of our citizens in favour of health and life.

A second cause, is the assistance which has been afforded to the practice of physic, by the numerous and important discoveries that have lately been made in anatomy, natural history, and chemistry, all of which have been conveyed, from time to time, to the physicians of the city, by means of the Philadelphia and hospital libraries, and by the lectures upon those branches of science which are annually delivered in the university of Pennsylvania.

3. The application of reasoning to our science has contributed greatly to extend its success in the cure of diseases. Simply to observe and to re-

member, are the humblest operations of the human mind. Brutes do both. But to *theorize*, that is, to *think*, or, in other language, to compare facts, to reject counterfeits, to dissolve the seeming affinity of such as are not true, to combine those that are related, though found in remote situations from each other, and, finally, to deduce practical and useful inferences from them, are the high prerogatives and interest of man, in all his intellectual pursuits, and in none more, than in the profession of medicine.

4. The accommodation of remedies to the changes which are induced in diseases by the late revolutions in our climate, seasons, and manners, has had a sensible influence in improving the practice of medicine in our city. The same diseases, like the descendants of the same families, lose their resemblance to each other by the lapse of time; and the almanacks of 1803 might as well be consulted to inform us of the monthly phases of the moon of the present year, as the experience of former years, or the books of foreign countries, be relied upon to regulate the practice of physic at the present time, in any of the cities of the United States.

5. From the diffusion of medical knowledge among all classes of our citizens, by means of me-

dical publications, and controversies, many people have been taught so much of the principles and practice of physic, as to be able to prescribe for themselves in the forming state of acute diseases, and thereby to prevent their fatal termination. It is to this self-acquired knowledge among the citizens of Philadelphia, that physicians are in part indebted for not being called out of their beds so frequently as in former years. There are few people who do not venture to administer laudanum in bowel complaints, and there are some persons in the city, who have cured the cynanche trachealis when it has occurred in the night, by vomits and bleeding, without the advice of a physician. The disuse of suppers is another cause why physicians enjoy more rest at night than formerly, for many of their midnight calls, were to relieve diseases brought on by that superfluous meal.

6. The dispensary instituted in our city, in the year 1786, for the medical relief of the poor, has assisted very much in promoting the empire of medicine over disease and death. Some lives have likewise been saved by the exertions of the humane society, by means of their printed directions to prevent sudden death; also, by the medical services which have lately been extended to out-patients,

by order of the managers of the Pennsylvania hospital.

7thly and lastly. A change, favourable to successful practice in Philadelphia, has taken place in the conduct of physicians to their patients. A sick room has ceased to be the theatre of imposture in dress and manners, and prescriptions are no longer delivered with the pomp and authority of edicts. On the contrary, sick people are now instructed in the nature of their diseases, and informed of the names and design of their medicines, by which means faith and reason are made to co-operate in adding efficacy to them. Nor are patients left, as formerly, by their physicians, under the usual appearances of dissolution, without the aid of medicine. By thus disputing every inch of ground with death, many persons have been rescued from the grave, and lived, years afterwards, monuments of the power of the healing art.

From a review of what has been effected within the last nine and thirty years, in lessening the mortality of many diseases, we are led to look forward with confidence and pleasure to the future achievements of our science.

Could we lift the curtain of time which separates the year 1843 from our view, we should see cancers, pulmonary consumptions, apoplexies, palsies, epilepsy, and hydrophobia struck out of the list of mortal diseases, and many others which still retain an occasional power over life, rendered perfectly harmless, *provided* the same number of discoveries and improvements shall be made in medicine in the intermediate years, that have been made since the year 1766.

But in vain will the avenues of death from those diseases be closed, while the more deadly yellow fever is permitted to supply their place, and to spread terror, distress, and poverty through the city, by destroying the lives of her citizens by hundreds or thousands every year. Dear cradle of liberty of conscience in the western world! nurse of industry and arts! and patron of pious and benevolent institutions! may this cease to be thy melancholy destiny! May Heaven dispel the errors and prejudices of thy citizens upon the cause and means of preventing their pestilential calamities! and may thy prosperity and happiness be revived, extended, and perpetuated for ages yet to come!

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